INPUT

STRATEGIC MARKET PERSPECTIVE

Systems Integration in Health Services

U.S. Systems Integration Program

Digitized by the Internet Archive
in 2015

https://archive.org/details/systemsintegrati00unse_2

JANUARY 1994

SYSTEMS INTEGRATION IN HEALTH SERVICES

INPUT®

San Francisco • New York • Washington, D.C. • London • Paris • Frankfurt • Tokyo

Published by
INPUT
1881 Landings Drive
Mountain View, CA 94043-0848
U.S.A.

Systems Integration Program

Systems Integration In Health Services

Copyright © 1994 by INPUT. All rights reserved.
Printed in the United States of America.
No part of this publication may be reproduced or distributed in any form, or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

The information provided in this report shall be used only by the employees of and within the current corporate structure of INPUT's clients, and will not be disclosed to any other organization or person including parent, subsidiary, or affiliated organization without prior written consent of INPUT.

INPUT exercises its best efforts in preparation of the information provided in this report and believes the information contained herein to be accurate. However, INPUT shall have no liability for any loss or expense that may result from incompleteness or inaccuracy of the information provided.

SI6 • 658 • 1993

INPUT®

INTERNATIONAL IT INTELLIGENCE SERVICES

Clients make informed decisions more quickly and economically by using INPUT's services. Since 1974, information technology (IT) users and vendors throughout the world have relied on INPUT for data, research, objective analysis and insightful opinions to prepare their plans, market assessments and business directions, particularly in computer software and services.

Contact us today to learn how your company can use INPUT's knowledge and experience to grow and profit in the revolutionary IT world of the 1990s.

SUBSCRIPTION SERVICES

- **Information Services Markets**
  - Worldwide and country data
  - Vertical industry analysis
- **Systems Integration and Business Process Re-engineering**
- **Client/Server Applications and Directions**
- **IT Outsourcing Opportunities and Analysis**
- **Information Services Vendor Profiles and Analysis**
- **EDI/Electronic Commerce**
- **U.S. Federal Government IT Markets**
- **IT Customer Services Directions**
- **Multimedia Opportunities**

SERVICE FEATURES

Research-based reports on trends, etc. (Over 100 in-depth reports a year)

Frequent bulletins on events, issues, etc.

5-year market forecasts

Competitive analysis

Access to experienced consultants

Immediate answers to questions

DATABASES

- **Software and Services Market Forecasts**
- **Software and Services Vendors**
- **U.S. Federal Government**
  - Procurement Plans (PAR)
  - Forecasts
  - Awards (FAIT)
- **Commercial Application LEADS**

CUSTOM PROJECTS

For Vendors—analyze:

- **Market strategies and tactics**
- **Product/service opportunities**
- **Customer satisfaction levels**
- **Competitive positioning**
- **Acquisition targets**

For Buyers—evaluate:

- **Specific vendor capabilities**
- **Outsourcing options**
- **Systems plans**
- **Peer position**

OTHER SERVICES

Presentations to user groups, planning meetings, etc.

Acquisition/partnership searches

Newsletters

INPUT WORLDWIDE

Frankfurt
Sudetenstraße 9
D-35428 Langgöns-Niederkleen
Germany
Tel. +49 (0) 6447-7229
Fax +49 (0) 6447-7327

London
17 Hill Street
London W1X 7FB
England
Tel. +44 (0) 71 493-9335
Fax +44 (0) 71 629-0179

New York
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
U.S.A.
Tel. 1 (201) 801-0050
Fax 1 (201) 801-0441

Paris
24, avenue du Recteur Poincaré
75016 Paris
France
Tel. +33 (1) 46 47 65 65
Fax +33 (1) 46 47 69 50

San Francisco
1881 Landings Drive
Mountain View
CA 94043-0848
U.S.A.
Tel. 1 (415) 961-3300
Fax 1 (415) 961-3966

Tokyo
Saida Building, 4-6,
Kanda Sakuma-cho
Chiyoda-ku, Tokyo 101
Japan
Tel. +81 3 3864-0531
Fax +81 3 3864-4114

Washington, D.C.
1953 Gallows Road
Suite 560
Vienna, VA 22182
U.S.A.
Tel. 1 (703) 847-6870
Fax 1 (703) 847-6872

M&S 459/01 12/93

Table of Contents

I	Introduction	I-1
	A. Purpose	I-1
	B. Scope and Use	I-2
	C. Methodology	I-3
	D. Related Reports	I-3
II	Executive Overview	II-1
	A. Health Care Industry Overview	II-1
	B. U.S. Health Care Information Services Market	II-3
	1. Total Market Size	II-3
	2. Definition of the Systems Integration Delivery Mode	II-5
	C. Systems Integration Opportunities in the Health Services Industry	II-8
	1. General Information Services Needs	II-8
	2. User Requirements and Analysis	II-10
	3. Keys to Success in Penetrating the Health Information Services Markets	II-12
III	Health Services Industry Issues and Trends	III-1
	A. General Health Care Industry Issues	III-1
	1. Medical Cost Containment	III-2
	2. Services: Oversupply and Shortages	III-3
	3. Adapting to Managed Care Pricing and Documentation	III-4
	4. Achieving Profits—or Breakeven	III-6
	5. Federal Health Care Reform	III-7
	6. Financial Restrictions	III-8
	B. Health Services Information Systems Technology Trends	III-10
	1. IS Centralization Within Institutions	III-10
	2. Hot Technologies	III-10

© 1994 by INPUT. Reproduction Prohibited.

Table of Contents (Continued)

III

a. The Integrated (Electronics-based) Patient-Care Record III-11
b. Open Systems/UNIX III-12
c. EDI/Electronic Commerce III-12
3. Principal Health Services Information Services Applications III-16

IV

User Requirements and Analysis IV-1

A. Analysis of INPUT's Opportunity Database IV-3
B. User Needs Analysis IV-5
1. Relative Importance of Particular Information Technology for Health Services Applications IV-5
2. Planned SI Applications, Among Survey Respondents That Could Involve Internal or External Systems Integration Resources IV-5
3. Important Criteria in Choice of an Outside Systems Integrator IV-6
C. Vendor Response IV-7
1. Preferred Pricing Approaches of SI Vendors IV-7
2. General SI Vendor Trends IV-10
a. Evolving Definition of the Systems Integration Delivery Mode IV-10
b. Strategic Partnering IV-11

V

Keys to Success in Penetrating the Health Care Information Services Markets V-1

A. Targeting Opportunities V-1
B. Successful Marketing Approaches V-2
C. Major Contract Awards V-4

Appendix

A. Health Services User Questionnaire A-1

© 1994 by INPUT. Reproduction Prohibited.

Exhibits

II	-1	Health Care Expenditures as a Percentage of GDP	II-2
	-2	Health Services, U.S. Information Services Market by Delivery Mode, 1993-1998	II-4
	-3	Systems Integration Market Size and Growth Rate Projections for the Fastest-Growing Vertical Markets	II-5
	-4	Products/Services in Systems Integration Projects	II-6
	-5	Most Frequently Mentioned SI Applications Cited in INPUT's Survey of U.S. Health Services Providers	II-11
	-6	Important Criteria for Health Care Provider Respondents in Choosing an Outside Systems Integrator	II-12
III	-1	Health Services, Key Medical Industry Issues	III-1
	-2	Health Services, Controlling Medical Costs	III-2
	-3	Health Services, Variations in the Supply of Medical Services	III-3
	-4	Health Services, Managed Care: The New Financial Realities	III-5
	-5	Health Services, Medical Industry Profitability Issues	III-6
	-6	Health Services, Hot Technologies for Medical Services	III-10
	-7	Key Health Care Electronic Commerce Market Forecasts	III-13
	-8	Average Processing Costs Per Purchase Order: Manual, EOE, and EDI	III-16
	-9	Health Services, Categories of Medical Information Systems	III-18
IV	-1	Examples of More Recent Systems Integration Applications in the Health Services Industry	IV-2
	-2	New Application Opportunities for Systems and Services in the Health Services Markets	IV-3
	-3	Examples of Systems Integration Applications Identified in INPUT's Survey of Health Services Computer Application Decision Makers	IV-4
	-4	Most Frequently Mentioned SI Applications Cited in INPUT's Survey of U.S. Health Services Providers	IV-6

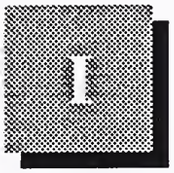
© 1994 by INPUT. Reproduction Prohibited.

Exhibits (Continued)

IV

-5 Important Criteria among Health Care Provider Respondents in Choosing an Outside Systems Integrator IV-7
-6 Preferred Pricing Approaches of SI Vendors Among Health Care Provider Respondents IV-8
-7 Medical and Health Care, Leading Applications Software Vendors, 1993 IV-12

© 1994 by INPUT. Reproduction Prohibited.



Introduction

A Purpose

Systems integration becomes more complex as new technologies are rapidly introduced. The definition of systems integration undergoes continuous revision and updating in the user's view. When does a client ask for help in implementing a new system? Where are new technologies that are an integral part of the system ultimately delivered? Should the client contract with a systems integration vendor simply to combine existing hardware and software technologies into a more comprehensive system?

Systems integration projects can result in significantly improved operating performance and can be critical to the continued success of the many companies.

Systems integration projects can reflect different uses of new technologies or different approaches to using existing technology. The first instance relies heavily on new technologies. Use of new technologies will result in a change in the way the company does business. New technologies, properly implemented to leverage their capabilities, can bring great value and benefit to any company. However, this can be a very dramatic approach to fixing a business problem.

The second alternative is a much more traditional approach, moving forward using proven systems as a basis for change. This evolutionary approach can achieve some business goals, but may fall short in providing many of the capabilities desired by the end users of the system—and at the same time bring along the historical encumbrances of the systems being combined.

Introducing new technologies is a complex process and can be very risky, even when adequate planning has been done. Companies operating within tight financial constraints may not have the resources to implement and then manage new technologies. The very skills needed to reduce risks of

© 1994 by INPUT. Reproduction Prohibited.

implementation sometimes cannot be developed internally—making the risks even greater. Assistance from a systems integrator can spell the difference between success and failure of such a project.

This report, provided as part of INPUT's Systems Integration Program, addresses the relationship between systems integration and a number of new technologies—from the perspective of the systems integration community. This report was developed to provide the necessary insights for systems integrators to answer the following questions as they plan their business strategies:

- What are the key technologies to watch through 1995? Why are they important?
- Which technologies are likely to require implementation by a systems integrator?
- What needs to be done to prepare marketable SI services based on these technologies?
- How will integrators sell these new services?

B
Scope and Use

The report focuses primarily on the extent to which implementation of new technologies are reasons to contract for systems integration services.

The report addresses several health services information services technologies and approaches to technologies that are generally considered to be of growing importance. For each technology, industry information systems managers were asked to indicate the relative importance to their business today and in 1995; whether they have skills to implement the technology; and whether they intended to select a systems integration vendor to assist in implementation in their systems integration business.

C
Methodology

Data for the report was derived from both primary and secondary research. Secondary data was used to develop an understanding of the technologies and the benefits that can result from their use. Primary data was collected from interviews with health services industry users and systems integrators who address the health service industry.

The report excludes in-depth discussion of technical issues.

© 1994 by INPUT. Reproduction Prohibited.

D
Related Reports

Systems Integration Technology Trends (1991)

Systems Integration Trends and Forecast, 1992-1997 (1992)

Impact of Downsizing on Systems Integration (1993)

Impact of Outsourcing on Systems Integration (1993)

Interaction of Downsizing with Outsourcing (1993)

Networking Systems Integration Opportunities (1993)

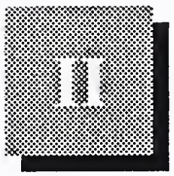
Methods for Successful Systems Integration (1992)

Systems Integration Opportunities in Re-engineering (1993)

© 1994 by INPUT. Reproduction Prohibited.

(Blank)

© 1994 by INPUT. Reproduction Prohibited.



Executive Overview

A
Health Care Industry Overview

The national health and medical services industry (SIC 80), as defined by the U.S. Commerce Department, consists of hospitals; offices and clinics of medical doctors; nursing homes; other specialized health care facilities and managed care plans, such as health maintenance organizations (HMOs) and preferred provider organizations (PPOs); and independent practice associations (IPAs).

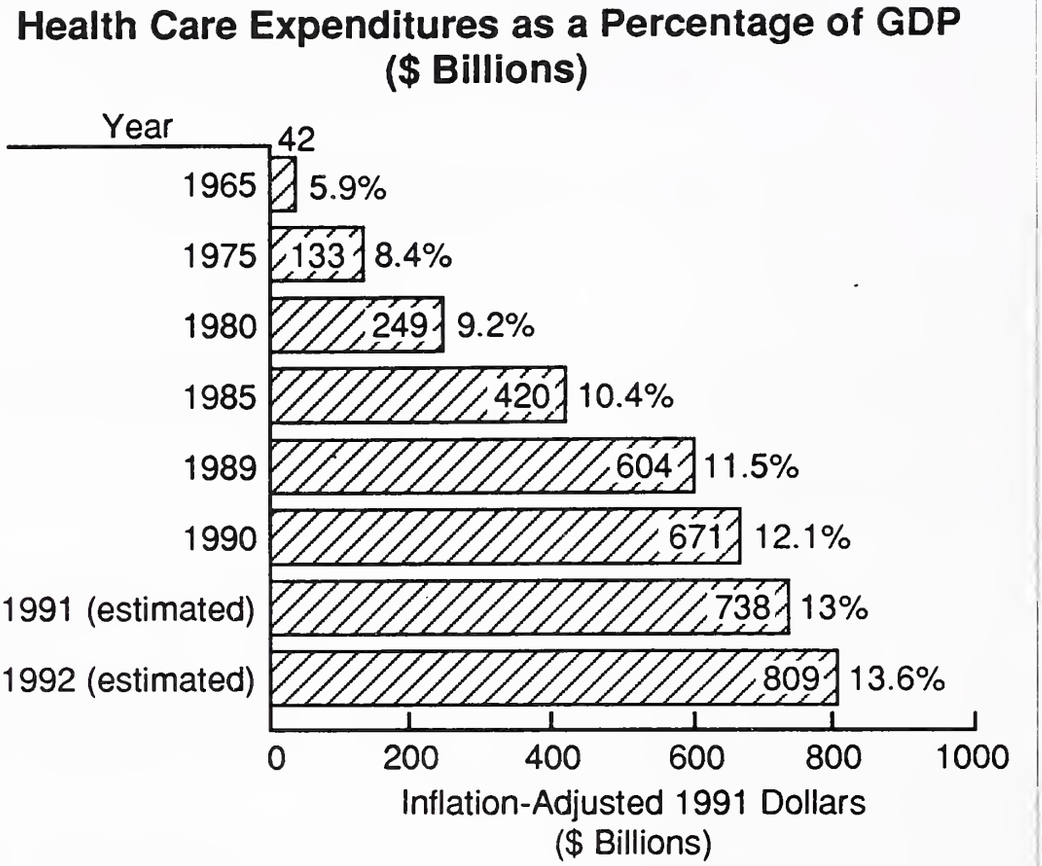
Of the more than $900 billion projected by the U.S. Commerce Department to be spent in 1993 for national health and medical services, by far the largest spending category is hospital care, at more than $360 billion, followed by physician services, at more than $170 billion. Nursing home care—at more than $75 billion—ranks third. Although much smaller in total spending—slightly more than $15 billion—the 1992-1993 growth rate of 30% for home health services is more than double for most other categories in the sector.

The U.S. Commerce Department indicates that total health services expenditures now represent more than 14% of GDP, which is considered the highest of any industrialized country.

Health Care Expenditures in the U.S. as a percentage of GDP have risen dramatically over the past two and a half decades, as indicated in Exhibit II-1.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT II-1



This represents a CAGR of nearly 12% since 1965, which far exceeded the nominal growth rate in GDP (unit growth rate plus rate of inflation) over the same period. Although the increase in the health services price index moderated significantly over the past year, to 5.4% in 1993, the rate of increase is still high relative to the general rate of inflation. Therefore, the rate of increase in the health services cost factor will continue to augment health services cost containment. Factors contributing to this high growth rate in health services costs are numerous, and in many cases involve complex medical ethical issues.

Some of the more easily identifiable factors are:

- Graying of America, as the nation's elderly population rises from 13% of all citizens to an estimated 19% in 2030;
- Increase in urban "social" ills, which puts additional strain on urban medical delivery systems;

© 1994 by INPUT. Reproduction Prohibited.

- Increased spending on high-priced medical equipment;
- Development of more effective treatment modalities, which (ironically) unlike new products in other markets, actually can significantly increase solution costs;
- Strong growth in remuneration for health care employees, partly related to personnel shortages in some areas;
- Inefficient delivery of Health Services with extensive duplication of expensive services in geographical markets of close proximity.

Rapid increase in health care spending has also been accompanied by significantly reduced profits at many leading health care institutions, such as hospitals and long-term care (nursing home) facilities. This also reflects a number of factors:

- Rapidly rising costs in labor-intensive businesses;
- Lower usage rates at many hospitals;
- Changes in Medicaid and Medicare reimbursement formulas, which tend to cap prices and reduce length of (in-house) treatment regimens;
- Increasing competition from HMOs and PPRs that provide price competition for traditional fee-for-service type institutions.

B

U.S. Health Care Information Services Market

1. Total Market Size

The total U.S. Information Services Market for the Health Services industry includes expenditures for the following information services delivery modes: professional services; systems integration; systems operations (outsourcing); processing services; network services; systems software products; application software products; and turnkey systems. Equipment sales in this market size model are primarily included within the two delivery modes of turnkey systems and systems integration.

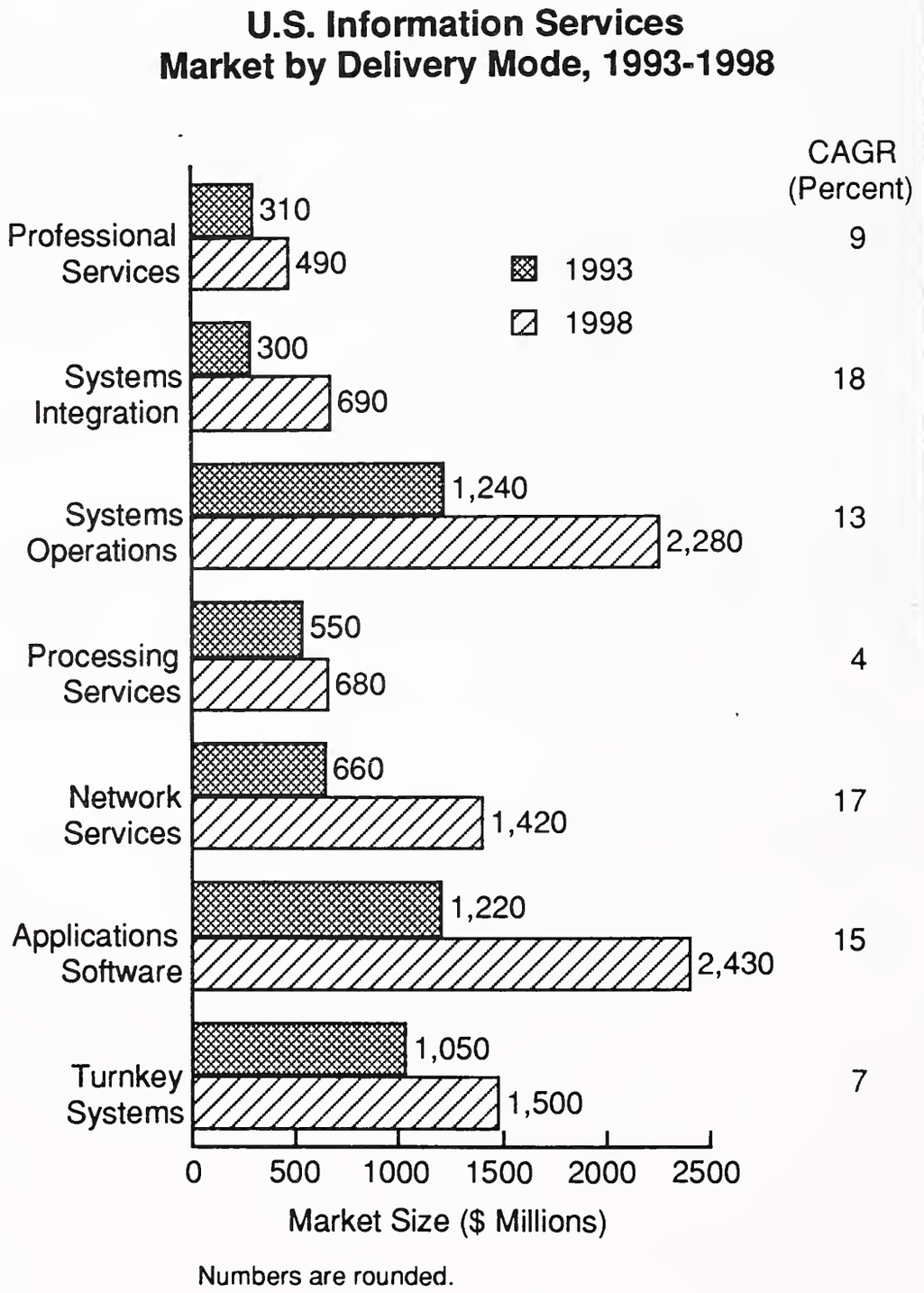
INPUT projects that the size of the total U.S. Information Services Market for Health Services delivery will be approximately $5.3 billion in 1993, and will expand at a CAGR of 12% over the next five years. This is in line with INPUT's forecasted five-year CAGR for total U.S. Information Services expenditures (which includes all industry-specific and cross-industry markets) over the same time period.

© 1994 by INPUT. Reproduction Prohibited.

The fastest growing U.S. Health-related Information Services markets (by delivery mode) are presented in Exhibit II-2.

EXHIBIT II-2

Health Services

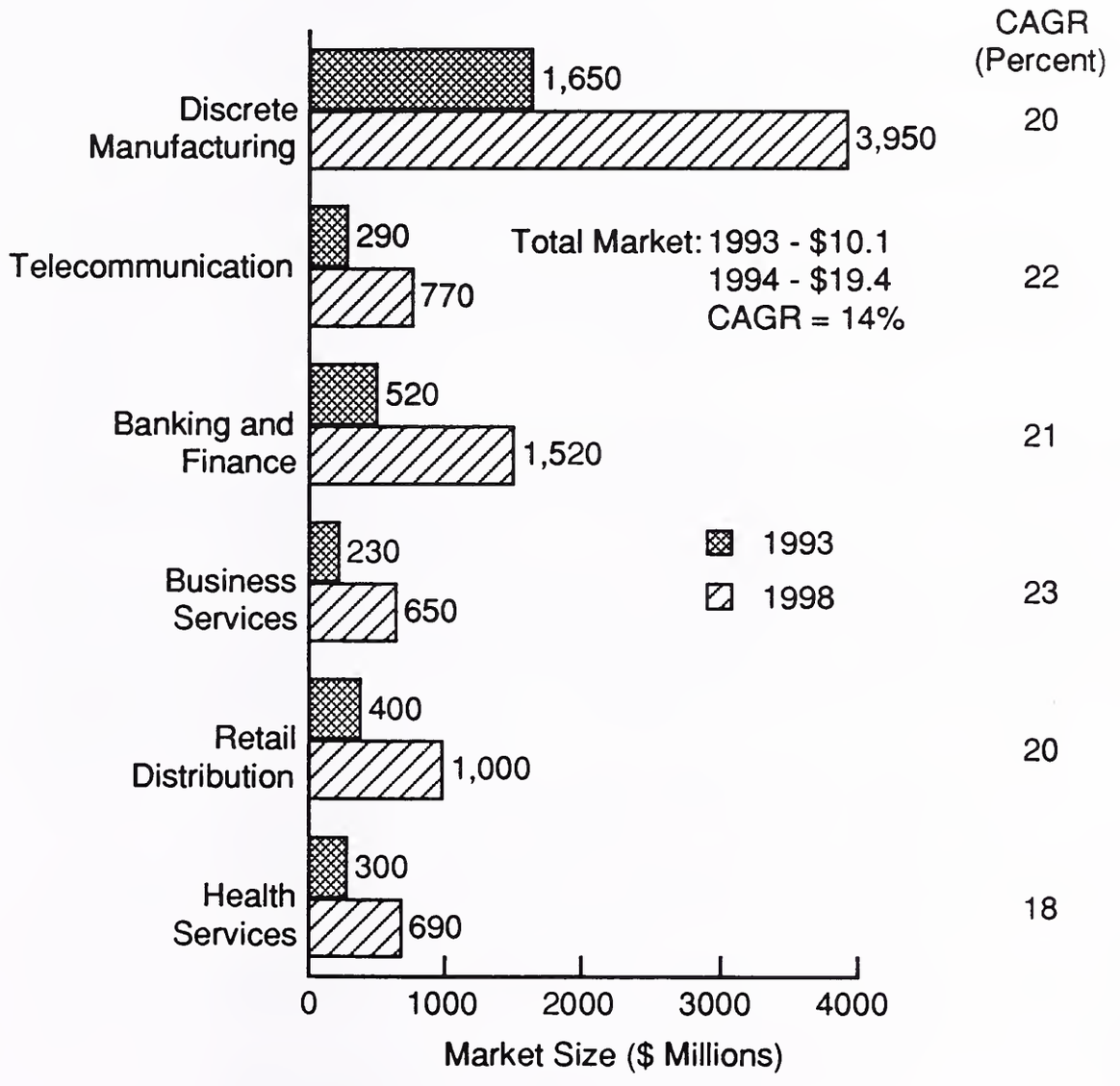


The Systems Integration Health Services Market, one of the smallest segments of the Health Services market, is projected to be one of the higher growth segments over the next five years (See Exhibit II-3).

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT II-3

Systems Integration Market Size and Growth Rate Projections for the Fastest-Growing Vertical Markets



Numbers are rounded.

Network services and applications software products represent the second and third fastest growing market segments, with above average growth also expected for systems operations.

2. Definition of the Systems Integration Delivery Mode

Although systems integration (SI) as an information technology (IT) delivery mode has existed for a number of years, its definition is still evolving.

Systems integration is traditionally defined as a vendor service that provides a complete (or total) solution to an information system, networking or automation development requirement through custom selection and implementation of various information systems products and services (See Exhibit II-4).

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT II-4

Products/Services in Systems Integration Projects

- *Equipment*
  - Information systems
  - Communications
- *Software Products*
  - Systems software
  - Applications software
- *Professional Services*
  - Consulting
    - Business process re-engineering
    - Feasibility and trade-off studies
    - Selection of equipment, network and software
  - Program/project management
  - Design/integration
    - Systems design
    - Installation of equipment, network, and software
    - Demonstration and testing
  - Software development
    - Modification of software packages
    - Modification of existing software
    - Custome development of software
    - Change management
  - Education/training and documentation
  - Systems operations/maintenance
- *Other Miscellaneous Products/Services*
  - Site preparation
  - Data processing supplies
  - Processing/network services
  - Data/voice communications services

© 1994 by INPUT. Reproduction Prohibited.

The major components of a systems integration solution include: *equipment*, which may be custom as well as off-the-shelf equipment that meets the unique needs of a project; *software products*, which can involve prepackaged applications and systems software or custom application development and maintenance; *professional services*, which includes the value-added component that adapts equipment and develops, assembles or modifies software to meet systems requirements; and *other services*, which includes miscellaneous items such as engineering services, business support services and other items required for a smooth development effort. (INPUT's market size figures for the total health care information services market do not include the equipment portion).

A systems integrator is responsible for the overall management of a systems integration contract and is the buyer's single point of contact for delivery of the specified systems function, on schedule, and at the contracted price.

In recent years, the number of companies that identify themselves as systems integrators expanded significantly. In particular, a number of computer systems, value-added resellers, systems software and professional services companies recently expanded their product offerings to include systems integration, which greatly heightened the level of SI industry competition. However, only a few large vendors still provide the full range of services and project management skills to qualify as prime SI contractors.

Many other companies primarily provide professional services and act as subcontractors to large prime systems integration vendors. The key distinction between professional services consulting and systems integration depends on who bears ultimate responsibility for planning and managing a systems installation project. Consulting firms typically provide analytical or technical support as professional services to their clients, seldom bearing responsibility for the result of an implementation project. Systems integrators, in contrast, act as general contractor on a systems project, assuming project management responsibility and generally bearing some financial risk for the project's success.

INPUT estimates that there are approximately 30 U.S. Information Services vendors that currently qualify as prime contractors of systems integration services.

Over the next five years, the information technology industry as a whole will evolve into much more of an integrated product/services delivery mode. Systems integrators will be a major marketing channel for delivery of the more complex integrated solutions to the largest available market: large corporations that have traditionally done much of their Information

© 1994 by INPUT. Reproduction Prohibited.

Systems development in-house. The complexity of distributed, enterprise-wide solutions creates the need for central IS staffs and user departments to seek third-party systems integrators to implement these more complex solutions.

INPUT's projected five-year (1993-1998) CAGR for the systems integration market is 14%, compared to a 12% five-year CAGR projection for the total information technology market. However, many systems integrators are significantly broadening their scope of information services delivery to include more systems operations/management and software application/maintenance, which enhances individual company growth rates with market penetration of other, higher-growth IT markets.

Primary factors driving the systems integration market include: rapid increase in demand for *business process re-engineering*; strong demand for *network integration;* and *increasing confidence in systems integration firms* as potential SI clients see more examples of successful implementation.

Vendors in other delivery modes must evaluate partnerships with large systems integrators to successfully market to large corporations that will seek more of a total solutions capability provided by single points of contact for development and support.

C

Systems Integration Market Opportunities in the Health Services Industry

1. General Information Services Needs

The medical care industry is somewhat behind other industries in the implementation of systems integration solutions, such as databases and network services applications. However, the need for such SI solutions is probably one of the highest of any industry. This relates to the need to reduce industry costs through eliminating redundant applications in the delivery of health services.

Of the 15 major vertical markets for systems integration information services, Health Services represents the eighth largest, at approximately $270 million in 1992. It is anticipated to be the sixth fastest-growing SI market at a five-year CAGR of 18%, as shown in Exhibit II-3, which is 50% above INPUT's forecasted growth rate for the total information services industry for the same time period.

For years, hospitals have extensively used outside vendors—starting with remote processing services and often turning to turnkey and application software vendors—to meet their information systems needs. There is no reason to believe this need will decrease. Managed care, managed

© 1994 by INPUT. Reproduction Prohibited.

competition and federal health care reform all drive medical institutions to change at a pace that internal expertise is unlikely to cope with, especially in terms of systems development, integration and implementation, as well as outright systems operation. Many large medical care services systems integration contracts have not been visible in publicly announced contract wins, but in part this may be due to institutions preferring to keep such contract information private for strategic reasons.

A principal negative issue for systems integration vendors addressing the health services market is slowing growth rates in revenue and profitability for many institutions. This relates in large part to price caps instituted for federally provided health services such as Medicare, declining insurance coverage for key portions of the U.S. population and increasing competition for health care delivery from more cost-effective managed care organizations.

The health care industry is undergoing major structural changes, which include acceleration in alliance activity across provider groups and consolidation within particular institutional sectors, such as acute care hospital providers.

In the recent past, much of the capital spending within health care has been for improving medical equipment, with less emphasis on information technology. This often led to redundancy of health service offerings within common geographical areas and has thus added to the cost of health care delivery.

INPUT's recent surveys of health services suppliers indicate more awareness of the need to increase spending for information technology to both reduce costs and improve health care delivery. Some of the major market areas for systems integrators are on-line electronic delivery of integrated databases of patient records across industry health care providers; development of open systems interfaces for health claims submission and supply chain linkage; and interdepartmental institutional database linkages for centralized budgeting. These types of applications are ways to address cost reduction needs as well as improve efficiencies and quality of treatment protocols.

However, budgetary constraints by various health care providers suggest that implementation of such integrated information services solutions should be approached more on a gradual basis, based on an open systems strategy. Some larger managed care organizations, which must optimize efficiencies of health care delivery, are among the best targets for systems integrators to market integrated database and network services solutions. Many of these institutions have also established strong sources of outside capital by becoming publicly traded entities.

© 1994 by INPUT. Reproduction Prohibited.

2. User Requirements and Analysis

INPUT surveyed a large number of health care institutions regarding their planned applications that would involve systems integration as well as other types of information services products and services.

Respondents say the most important technologies relative to their application development plans were network integration and integrated databases. Other technologies which ranked higher among the respondents included bar-code technology, EDI and open systems.

Health services central IS and user department respondents also identified particular types of systems integration applications they planned to implement over the next three years. Implementation could involve use of either internal or external systems integration resources.

Twenty-three different types of systems integration application alternatives were presented (see Appendix A—Questionnaire).

SI applications cited most frequently by respondents are shown in Exhibit II-5.

Users also selected their most important criteria in selecting an outside systems integrator. Responses are shown in Exhibit II-6.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT II-5

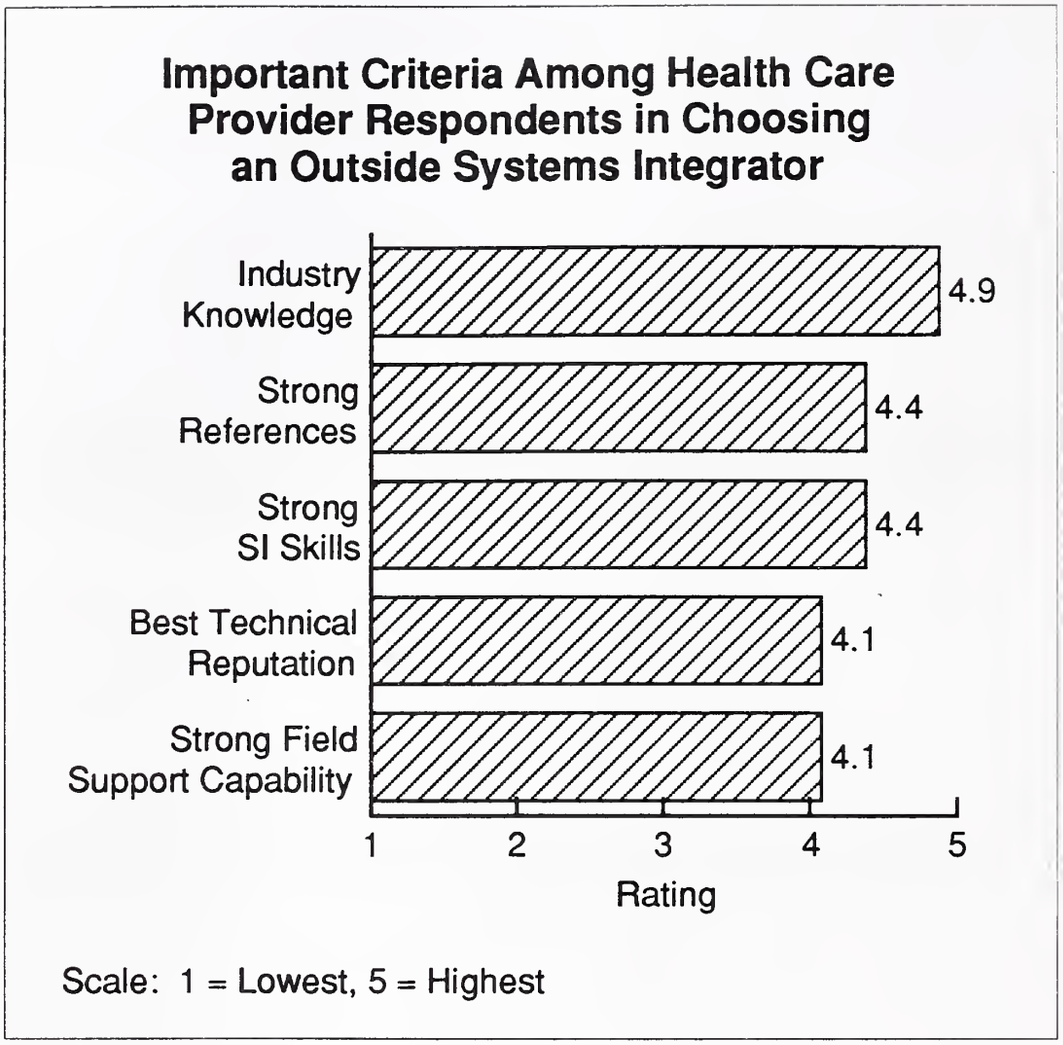
Most Frequently Mentioned SI Applications Cited in INPUT's Survey of U.S. Health Services Providers*

SI Application	Percent
• Integrated patient care management	86
• Implementation for open systems strategy	86
• Client/server (downsizing/rightsizing) implementation	83
• LAN integration	79
• Automation of patient protocol documentation	79
• Automation of insurance claims processing	79
• Development of a document management/ workflow interdepartmental solution	75
• Implementation of EIS for analyzing patient care costs	71
• Development of linkages between hospital financial systems and hospital clinical care facilities	71
• LAN to WAN integration	71
• Supply chain linkage (EDI/electronic commerce)	71

*Includes multiple responses from each respondent

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT II-6



Clearly, industry knowledge, good references, and strong technological capabilities are the three key criteria in their selection of an SI vendor.

3. Keys to Success in Penetrating Health Care Information Services Markets

Large, integrated managed care organizations, in particular, will likely provide innovation of integrated database and network services solutions, combining clinical, hospital and insurance company claims processing integration. Successful implementation of such cross-institutional integrated solutions should provide the reference points for systems integrators to addressing other Health Services providers with implementation reference models.

Also, systems integrators should consider providing EDI linkages among cross-industry participants (for claims processing, sharing of electronically-based patient records, etc.) to provide the critical mass to make such systems cost-effective. An initial major interenterprise application to

© 1994 by INPUT. Reproduction Prohibited.

health care will likely be EDI integration among suppliers, insurance companies and integrated managed care enterprise when these entities can see examples of cost benefits of such integrated network services programs based on industry standards.

Although the interenterprise solution of an integrated patient medical record is probably the ultimate solution, it appears at this stage of systems integration in the medical industry (which is somewhat behind other industries) that smaller integration steps are probably best to target. In particular, integration of institutional departmental database islands is probably the most realistic SI applications area to target at this stage in the development of the Health Services SI market.

© 1994 by INPUT. Reproduction Prohibited.

(Blank)

© 1994 by INPUT. Reproduction Prohibited.

III

Health Services Industry Issues and Trends

A

General Health Care Industry Issues

(Much of the content of this section is taken from INPUT's recent U.S. Information Service Management Analysis Program (MAP) vertical analysis of the Health Services Industry.)

Exhibit III-1 summarizes key issues facing the medical industry at this time.

EXHIBIT III-1

Health Services

Key Medical Industry Issues

- Medical cost containment
- Services: Oversupply and shortages
- Adapting to managed care pricing and documentation
- Achieving profits—or breaking even
- Federal health care reform

© 1994 by INPUT. Reproduction Prohibited.

1. Medical Cost Containment

Exhibit III-2 outlines issues of medical costs that impact the industry.

EXHIBIT III-2

Health Services

Controlling Medical Costs

- Medical cost increases, federal responses
- PPS- and DRG-based federal payments
- Medicare reimbursement patterns
- Managed care initiatives by business
- Hospitals: Inpatient versus outpatient services

The annual cost of medical care in the U.S. is increasing at an estimated rate of 7%, significantly above the general rate of inflation in 1993, which will drive national health care spending to the $900 billion level.

A major feature of President Clinton's National Health Care Reform Initiative is to control health care outlays. A proposed cut in Medicare reimbursement rates to reduce the projected growth in spending by $50 billion over a five-year period is one way the federal government can deal with the issue. Backing up the perception of a need for Medicare spending cuts is the projection by the Social Security Administration that—at current rates—the Medicare insurance trust fund will be bankrupt by the year 2000.

Calls for current and near-future cuts in federal health care spending build on changes that began in 1983 with the introduction of PPS (Prospective Payment System) and DRGs (Diagnosis-Related Groups). At that time the U.S. government undertook major changes in federal Medicare payment for hospital in-patient treatment.

With PPSs and DRGs, suddenly hospitals and physicians with Medicare patients were forced to enter the world of cost-accounting to avoid losses under federal standards, rather than just charging "usual and customary" rates that they could modify on their own. Moreover, the period since 1983 represented an unrelenting squeeze in Medicare reimbursement patterns, with the federal government revising DRG-based payment schedules yearly. Generally, these revisions represented reductions in rates paid for treating specific conditions.

© 1994 by INPUT. Reproduction Prohibited.

Business continues to bear the brunt of health care cost increases, partly because employer-paid insurance fees reflect shifting health care costs—especially by hospitals—from uninsured and shrinking Medicare and Medicaid reimbursements to charges levied on other patients.

Business response has been a strong migration toward "managed care," a loosely used term understood today as encompassing much more than Health Maintenance Organizations (HMOs) that provide strictly controlled service on a fixed-fee basis to subscribing employers. As a broader concept, managed care can be thought of as any set of limits on an enrollee's ability to choose physicians or treatment options on their own; also, managed care generally includes some form of cost controls. While HMO enrollment is substantial—18% of the nonelderly population as of 1991—a comparable number of Americans are covered by Preferred Provider Organizations (PPOs) that apply financial incentives to encourage health care consumers to use doctors and institutions that have negotiated discounted rates with the PPO. Finally, almost all other employer-paid health coverage plans today require some form of precertification (approval before non-emergency treatment) or other controls on medical services that save money for the business paying for these services.

A substantial national shift from inpatient to outpatient services is a result of federal programs and business initiatives to limit medical costs. For example, more than half of all surgery is now done on an outpatient basis. Hospital executives surveyed anticipated that by the year 2000, net outpatient revenues will account for more than half of all hospital patient revenues.

2. Services: Oversupply and Shortages

Nationally, the U.S. faces a contradiction between general oversupply and specific shortages, as outlined in Exhibit III-3.

EXHIBIT III-3

Health Services

Variations in the Supply of Medical Services

- National oversupply of hospital beds
- Urban areas: Public hospitals in distress
- Unbalanced specialization of doctors
- The plight of the uninsured

© 1994 by INPUT. Reproduction Prohibited.

Due in part to a strong cost-containment shift from inpatient to outpatient treatment, hospital admissions in 1990 totaled just 31 million, compared with 36 million in 1980. In parallel, according to the American Hospital Association, hospital occupancy rates have hovered at about 65% since 1985, meaning that roughly 200,000 hospital beds are empty—representing unreimbursed costs—each night.

The 5,300 community hospitals in the U.S. at the end of 1991 represent a decrease of roughly 10% since 1987, with 322 community hospitals shut down in that period and another 229 mergers. On both the nonprofit and for-profit sides, more mergers and closures are expected if national health care reform is enacted. This is because reform's cost-control pressure on doctors and hospitals should drive hospital consolidations, acquisitions and other forms of alliances and collaborations—such as sharing high-tech equipment and certain services. In Boston, for example, five big teaching hospitals associated with Harvard Medical School are consulting on eliminating redundancies, both by reducing excess numbers of beds and by cutting duplicate high-technology programs; observers see these other Boston-area changes leading to thousands of medical services staff layoffs. On a national basis, such changes generally must be made to cut excess capacity locally and better cover fixed costs, or so that hospital groups can negotiate more strongly for managed care contracts.

Unfortunately, the national glut of hospital beds is out of sync with acute health care needs of urban areas—including needs that derive from urban concentrations of poverty, crime and drugs—especially given the financial distress of public hospitals that shoulder much of this type of medical care. In New York City, for example, only 10% of hospital beds are reported to be unoccupied. But for many poor and uninsured urban residents, the public hospital's emergency room is their only source of medical care. At the other end of the spectrum, some rural areas lost enough population that they can no longer support keeping a local hospital open.

Although medical-staffing experts documented strong needs for more effective primary and diagnostic care in the U.S., medical training and reimbursement systems remain strongly weighted toward specialization by doctors. The vast majority of new medical school graduates—more than 80% in 1992—are specialists, in part because the reimbursement system continues to reward specialists with better incomes. To better meet society's needs in the future, experts see new incentives established soon—most likely at the federal care level—to drive a shift toward more emphasis on primary care.

3. Adapting to Managed Care Pricing and Documentation

Exhibit III-4 summarizes financial realities of U.S. society's shift toward managed care.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT III-4

Health Services

Managed Care: The New Financial Realities

- Setting the pattern: Federal DRGs and the PPS
- Business-oriented HMOs and PPOs
- Evolving patterns of managed care
- Documentation issues
- Financial impacts of managed care
- Other impacts

Managed care plans increasingly pressure medical professionals and institutions to justify their actions according to treatment-protocol standards; highly visible malpractice suits and insurance company pressures often drive doctors to practice "defensive medicine," especially in the form of excessive testing. With improved protocol-related documentation, measurement of the relative quality of medical care, measured by medical outcomes, becomes more practical.

The bottom-line financial impact of managed care on health providers is negative. Gone is the 1980s period of provider-set rates. Rather, hospitals and doctors seeking to be included in PPOs and other forms of managed care find themselves forced to negotiate discounted rates in exchange for access to pools of patients. In an extension of the trend begun with Medicare DRGs and PPS, hospitals and doctors must carefully track, control and predict costs if they are to survive financially in the era of managed care.

One other impact of managed care—when practiced over wide geographic areas by Blue/Cross/Blue Shied plans or by large commercial insurers for national account clients—is to seek higher levels of account-wide coordination in the processing of claims for such accounts.

Another key impact of managed care, likely to accelerate under federal health care reform, is an increase in marketing-oriented activities by both for-profit and nonprofit hospitals as they position themselves to win preferred provider contracts. One important marketing factor will be their technology base for documenting care and billing.

© 1994 by INPUT. Reproduction Prohibited.

4. Achieving Profits—or Breakeven

A series of profitability issues derive from the current state of the medical industry, as outlined in Exhibit III-5.

EXHIBIT III-5

Health Services

Medical Industry Profitability Issues

- Competition among payers
- The impact of Medicare and managed care reimbursements
- The status of nonprofit hospitals
- For-profit hospital chains
- Reimbursement squeezes on doctors and clinics

A substantial change has taken place in how medical care is paid for. A relatively isolated world of payments made primarily by for-profit commercial health insurers or by nonprofit state Blue Cross/Blue Shield plans has given way to four-way competition among "the Blues," fee-for-service commercial insurers, managed care plans, and self-insurance programs where firms absorb employee's medical costs directly.

Some of the greatest profitability impacts—especially for the hospital sector—derive from federal DRGs and the PPS. This is especially true for the nonprofit public hospitals that get 52% of their revenues from Medicare and Medicaid. In this atmosphere, patient care *must* be carefully managed by the institution to maintain its financial health. Today, per-patient resource consumption and other costs must be tracked and balanced continually against federal standards or managed care limits, whether for a nonprofit seeking breakeven or a commercial hospital that needs to earn a profit. Indeed, now there is pressure to predict resource needs based on diagnosis, before tracking of actual treatment even begins. One limitation to doing so effectively, however, is that there are relatively few links yet between most hospital financial information systems and those for clinical care.

Hospitals—both profit and nonprofit—tend to achieve average operating margins of just 4.9% to 4.4% today, down from the 6% range that was typical in 1985. One factor here is rising hospital administrative costs: A recent study of 70 Pennsylvania hospitals found average 1983-to-1990 administrative cost increases of 90%—double the hospitals' average

© 1994 by INPUT. Reproduction Prohibited.

overall increase in spending. At these hospitals, administrative spending rose to 13.9% of budgets in 1990, versus 10.6% in 1993, especially due to increases in paperwork costs for quality assurance, utilization review, legal affairs and government affairs.

In addition to administrative and other cost increases and squeezes on reimbursements from public and private payers, margins are also impacted by a trend of declining inpatient admissions, which were down 1.1% in 1991 alone—one top of a 13.7% decline from 1980 to 1990—versus hospitals' high, largely fixed capital costs.

For years, the financial health of nonprofit public hospitals suffered from the burden of treating poor patients who could not pay. They now receive some relief from the federal Medicaid Disproportionate-Share Payment Program, which in fiscal 1993 provided an estimated $16 billion in subsidies to compensate for such treatments. Nonetheless, it is estimated that public hospitals as a whole need some $15 billion in capital investments to rebuild neglected capital facilities sufficiently to meet current accreditation standards. Federal health care reform should help—at least on the noncapital side—to the extent it guarantees payments and represents a commitment to universal health care coverage.

For-profit hospitals are shifting from the 1980s model of fast-rising charges paid by private insurers to an environment of managed care and fixed reimbursements. Today, they typically negotiate discounts in the 30% to 40% range. Clearly, emphasis now among for-profit hospitals must be on cost cutting and cost control to maintain profitability.

Under managed care, preset reimbursements to doctors—paid directly or through their group clinics—can be as much as 25% below their standard fee-for-service rates, representing a significant squeeze on clinic profits and to physicians' incomes that average more than $190,000 annually.

5. Federal Health Care Reform

Basically, health care reform proposes that the U.S. be the first nation to implement so-called "managed competition," extending the current managed care model of negotiated, reduced reimbursement rates to a national system of regional medical care buying groups, sometimes referred to as "regional health care alliances." Although there are significant differences, the closest current model to the likely plan—in terms of coverage levels and costs to the individual—appears to be today's coverage for federal workers under their Blue Cross/Blue Shield program.

Until Congress acts on the Clinton administration's proposal and the President signs a finalized health reform bill, many questions on how it will be implemented and financed remain.

© 1994 by INPUT. Reproduction Prohibited.

These questions reflect today's turmoil in the medical industry, and corresponding uncertainties are delaying implementation of important information technologies. However, 75% of those polled at a March 1993 conference of health industry information systems professionals believe that federal health care reform, once enacted, will accelerate institutions' spending for information systems and services.

6. Financial Restrictions

A major dilemma for health services institutions involves the tremendous need to reduce costs through the upgrading of their information systems technology where in many cases there isn't the financial base to fund the major changes required. Unlike companies in other industries, there are limits on the number of alternative sources for funding institutional health services capital expenditures.

One alternative is greater cooperation (consortiums) among providers in sharing development costs for funding information systems from which they all can benefit.

Current managed care delivery systems, which create interrelationships among providers, most likely provide the prototypical shared infrastructures for integrated data/document (EDI/Electronic Commerce) network services delivery on wide-band networks, which could represent the core background for such health care service intercommunity cooperation.

Another prototype is state-sponsored health information wide-area (broadband) networks, such as WHIN (Wisconsin Health Information Network), which links proprietary information systems of hospitals, physicians offices, laboratories, employers, insurance firms and other organizations with the Wisconsin Bell Telephone network. This networking project with common-user access was developed and installed by Ameritech Information Systems of Chicago. With the sharing of the network, costs for participants are significantly lower than for a proprietary network with less functionality.

Such information services offerings by the RBOCs was enabled by federal legislation in 1991, allowing regional Bell operating companies to provide information services. Other regional Bell companies focus on this market of computerized network access, which in addition to patient information records, could also provide other computerized storage and on-line access such as patient referral services.

The WHIN network will be used for both patient information retrieval and electronic health insurance claims delivery. It is a community health management system which is completely nonproprietary and open to all providers. Information resources that can be delivered on this bidirec-

© 1994 by INPUT. Reproduction Prohibited.

tional network include video; EKG, EEG, and radiology images; graphics and outcome analysis; and electronic claims forms. The ultimate aim is to provide the total patient electronic record, which includes every stop the patient makes for health care treatment.

The proposed managed competition structures under national health care reform could further expand such shared networking delivery services by including employers and health care suppliers, which would be banded together into large health-insurance purchasing networks.

Such networks, by establishing standard document protocol interfaces and common network protocols, could greatly decrease per transaction costs as well as speed up payments, which could reduce providers' working capital requirements.

Another example of a medical communications infrastructure is provided by Integrated Medical Systems, Inc. IMS Med Com provides communications services designed to automate clinical and administrative information delivery needs of health care providers and others who communicate with physicians. It provides storing and forwarding of messages (text, fax, voice, messages, clinical graphs and medical images).

Patient care will continue to be decentralized away from the hospital, which may create even further dispersion of the patient record. This will put even further pressure on medical providers to share integrated network services. A major cost benefit is not having to re-enter data on the patient as he or she travels among various health care providers.

Other factors pressuring medical care institutions to search for funding for new information technology investments include:

- External regulatory reporting requirements of the Joint Commission on Accreditation of Health Care Organizations (JCAHO);
- Need for total quality management improvement to attract new business and reduce costs;
- Ability to maximize the efficiencies of patient treatment protocols;
- Under managed care, the lack of pricing flexibility and the need to cut costs to improve profitability.

© 1994 by INPUT. Reproduction Prohibited.

B

Health Services Information Systems Technology Trends

1. IS Centralization Within Institutions

Especially among hospitals (where decentralized turnkey information systems purchases were the pattern in the past), today there is a trend toward more centralized control of systems budgets and spending. This is driven both by the necessity to manage information more carefully to meet payers' managed care accountability requirements and by strategic thrusts toward systems integration—especially of departmentally purchased systems, in a drive toward improved service throughout the hospital.

2. Hot Technologies

Many new technologies, listed in Exhibit III-6, affect the way the medical industry designs and implements information systems.

EXHIBIT III-6

Health Services

Hot Technologies for Medical Services

- Patient-care/medical records information systems
- Smart cards
- LAN-based/optical fiber medical community networking
- Medical community networking
- "Open systems" networking
- Client-server networked workstations
- Image storage and access
- Physician information systems
- Touch-screen technology
- Tablet/pen-based/radio-connected portable systems
- Expert systems
- Voice recognition
- Executive information systems
- RDBMSs
- EDI

© 1994 by INPUT. Reproduction Prohibited.

a. The Integrated (Electronics-based) Patient-Care Record

Overall, integrated database shared access within medical institutions and across medical communities will become increasingly important for reducing unnecessary document re-creation and reduce treatment inefficiencies to tackle one of the major sources of cost inefficiencies in medical care delivery.

Information resources in such integrated databases need to provide on-line access within and across institutional care providers on patients' clinical and financial records. This includes patient insurance records, scheduling and admittance records, patient-care bedside protocol delivery and monitoring, pharmaceutical and radiology records, as well as billing and paying records. This is often referred to as electronically supported patient care within an integrated Patient-Care/Medical Records Information Systems.

With studies consistently reporting that 25% to 40% of caregiver time in hospitals is spent on charting, quantitative benefits of such systems include efficiencies that reduce nurse staffing levels and overtime, plus cut hospitals' fast-rising administrative record-keeping costs.

A wide range of vendors now offer varying implementation of such systems on minicomputer and PC platforms, often under UNIX, to ease networking and systems integration. Despite the offering of many systems, critics complain that virtually none are comprehensive or fully integrated—they solve only part of the patient-care problem. In terms of actual implementations, a survey of more than 500 professionals at the 1992 Health Care Information Management and Systems Society annual conference showed that only 17% of hospitals have any form of bedside computers installed—and those systems were concentrated in critical care and surgery units; however, nearly double that number, 32%, were evaluating bedside systems.

The ease of data input and report access are very important in the health care setting, due to the mobility of many workers, as well as the speed of access which is often required. Consistency of a graphical user interface across applications (with multiapplication access through windowing technology) is also very important. As such, unique types of data input devices have considerable relevancies in the Health Services industry. These include: handless technology such as voice recognition; touch-screen technology; and tablet/pen-based/radio-connected portable systems.

A related technology that could become increasingly important for ease of patient record input and retrieval is the so-called "smartcard." The smartcard is a credit card-sized device that stores updatable electronic data on an embedded computer chip. Once institution-specific patient-care systems are standard in caring for the individual while inside the facility, the patient's smartcard could be loaded at discharge with the relevant records

© 1994 by INPUT. Reproduction Prohibited.

from that treatment. Then the next smartcard-equipped doctor, clinic, or hospital (most likely a member of managed care network) to treat that patient could use the smartcard to instantly access the individual's medical record. One inhibitor to smartcard implementation in the U.S., however, is a recommendation against its use by WEDI (the public/private Workgroup for Electronic Data Interchange), which favors instead communications system-based transfer of medical data.

b. Open Systems/UNIX

With the need for health care providers to integrate information resources, agreement on standards as part of the development of an open systems solution is probably more important here than in most other industries. Currently, standards debates relate to differences in standard interfaces for delivering and processing electronic insurance claims, which will be discussed in section C.

UNIX appears to have considerable support as an open systems standard among health services providers. An article in the March 1993 edition of *Computers in Health Care* journal noted a strong interest in UNIX among MIS directions of health services institutions. Principal benefits of UNIX cited by respondents were UNIX systems' portability, scalability and connectivity tools. Principal weaknesses included lack of commercial applications, lack of IS people trained in UNIX and lack of standardized versions of UNIX.

c. EDI/Electronic Commerce

(The following section is based on material from INPUT's Report on Electronic Commerce in U.S. Health Care.)

Electronic commerce in health care refers generally to interorganizational networks that connect computer systems, allowing health care community participants (including providers, insurance payers, suppliers and others) to coordinate their activities. Systems that support electronic commerce systems in health care are economically useful in four business functions, or workflows, in the health care industry:

- Procurement
- Claims Processing
- Claims Payment
- Utilization Review and Related Information Services

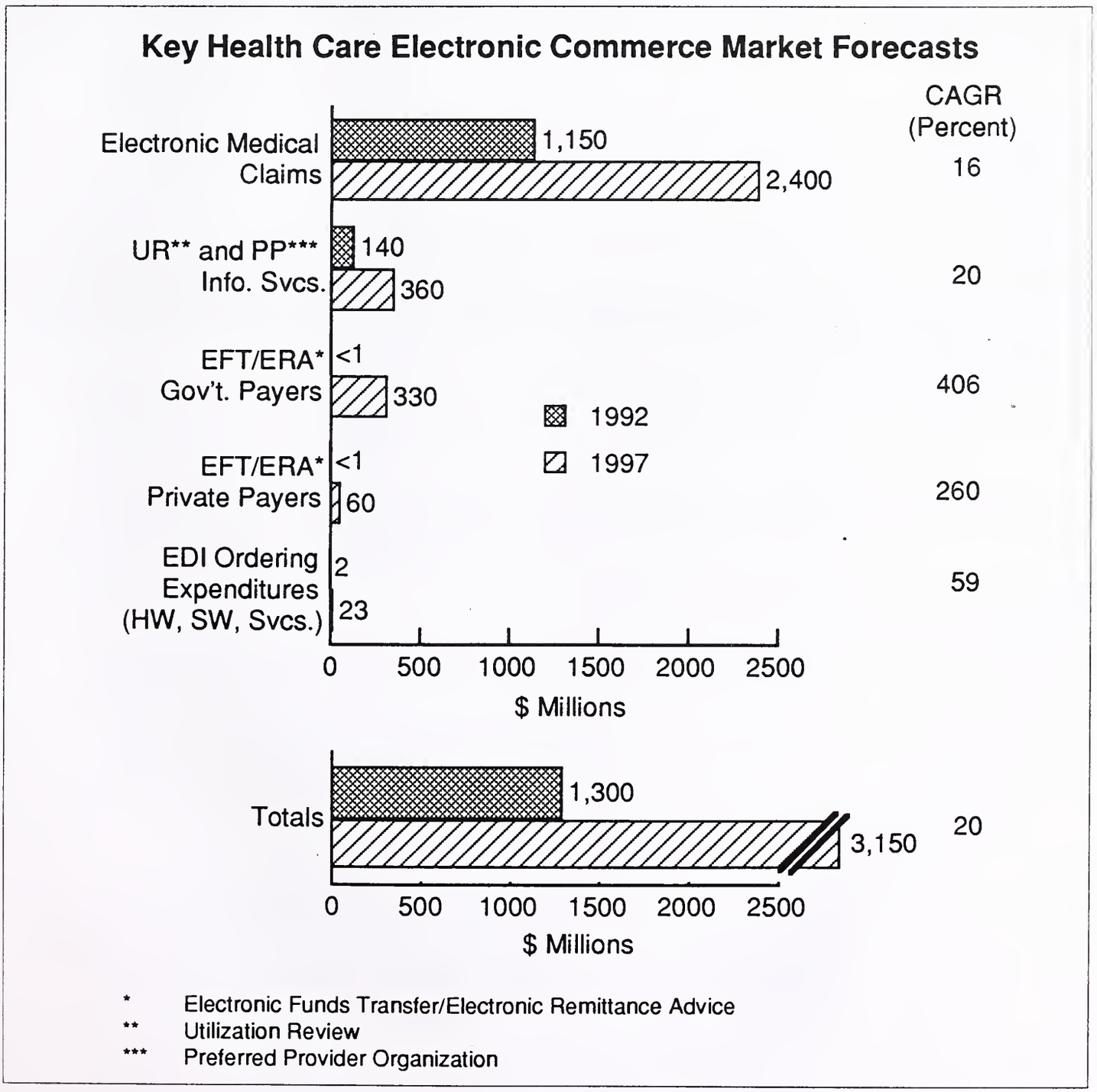
The expansion of these basic electronic commerce applications lays the groundwork for a nationwide health information network that will streamline the delivery, financing and administration of health care delivery.

© 1994 by INPUT. Reproduction Prohibited.

Current developments that establish the infrastructure required for such a system include: emerging standards; EDI and other interorganizational applications; and an increasing level of collaboration and communication among providers, payers, employers and government agencies.

Exhibit III-7 depicts forecasted growth in four key electronic commerce and EDI markets: EDI ordering, electronic medical claims, electronic payment and remittance, utilization review and PPO-related information services.

EXHIBIT III-7



© 1994 by INPUT. Reproduction Prohibited.

The market for electronic information exchange among health care institutions is driven by cost pressures and demands from major health care payers, providers and plan sponsors, with growing awareness of the benefits of electronic commerce.

Restraints to the growth of electronic commerce applications in health care stem largely from the complexity of the multilayered, multipayer, public-private, modified free enterprise health care system that exists in the U.S. These combined forces make the health care system reform an enormous undertaking.

Currently, EDI (as a standard interface for all types versus other forms of electronic commerce which use proprietary interfaces) is extensively used by medical suppliers to speed ordering, delivery, inventory management and routine supply billing. However, many leading health care product vendors still use their own proprietary electronic commerce delivery systems. Ability to establish an open standard for all forms of electronic commerce within the health care industry is a continuing issue.

Ultimately, all markets for electronic commerce in the health care sector identified in Exhibit III-7, could eventually develop standard EDI interfaces, with the exception of Utilization Review, which is one portion of the integrated database of the patient record representing different formats for data repository access.

Electronic claims processing represents the largest commercial market. It essentially represents the first step in building the infrastructure for a national health care information network. The technology, however, is still in its infancy. INPUT estimates that in the most widely used form of electronic commerce-based electronic claims processing (Medicare), only 10% of payments are now processed electronically. Only a fraction of that represents EDI claims (EDI defined as a standard interface versus proprietary interface format).

According to WEDI, there are now more than 400 different proprietary interfaces used in health care for the exchange of claims information. However, a consensus for ANSI X12 is emerging. In addition, health care providers in various regions of the company are building shared EDI networks as a way of both financing such electronic delivery systems as well as as reducing their transaction costs by working with an open systems structure.

The movement toward development of computerized patient record standards (as discussed earlier in this report) is in the organizational stage. One of its goals is also to develop standards for transmitting patient care information, which could support open electronic claims submission standards.

© 1994 by INPUT. Reproduction Prohibited.

Hospitals are also recognizing advantages of integrating the electronic ordering function with their overall materials management processes and their in-house information systems. Costs of duplicate data entry (into vendors' systems and in-house materials systems), and the fact that vendor-provided systems are not designed for the functional needs of a hospital materials department, add to the cost of using these systems.

Alternatives to EDI are proprietary electronic order entry (EOE) systems and manual systems. INPUT estimates that the total value of hospital purchases using standard EDI systems was approximately $16 million in 1992, or just about one-tenth of one percent of a hospital's total medical/surgical purchases of $15 billion. This compares to $9.3 billion in medical/surgical purchases using EOS systems, or 62% of total medical/surgical purchases.

In 1992, the Health Care EDI Corporation (HEDIC) signed an agreement with Sears Communications Company (now merged with IBM Information Network and called Advantis) and AT&T EasyLink to provide EDI network services for HEDIC members, a move aimed at the growing interest among hospitals and hospital buying groups to establish their own EDI capabilities.

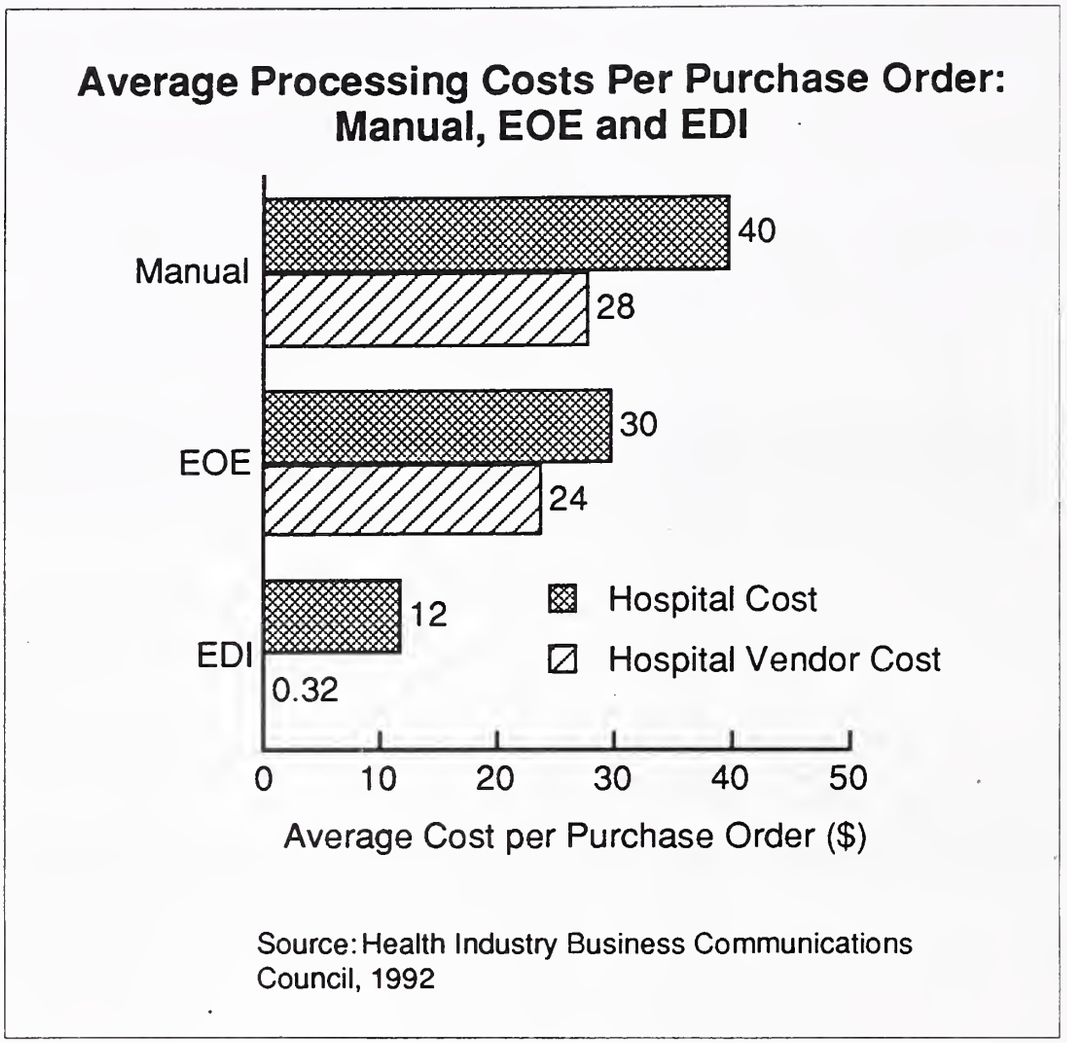
The HEDIC agreement, signed in March 1992, allows member groups and associate members (including both hospitals and suppliers) to purchase EDI services at a discounted rate, based on total usage for all HEDIC members. Several large hospital buying groups have recently contracted with Sears or EasyLink.

Standard EDI (using ANSI-X12 transaction sets) for hospital ordering is still extremely limited, but the cost benefits have not yet been widely documented.

As shown in Exhibit III-8, EDI further reduces transaction costs over EOE (proprietary) systems in comparison with manual purchasing systems.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT III-8



Source: Health Industry Business Communications Council, 1992

EDI represents a specific example of how using open systems standards represents an important approach to reducing medical care services costs. The adoption of electronic commerce for a number of interhealth services communication needs also represents one of the most cost-effective first steps in re-engineering business processes among medical care institutions.

3. Principal Health Services Information Services Applications

The Health Services information services market tends to be quite fragmented. There are hundreds of vendors providing solutions for specific applications. A major need exists to integrate these various departmental-based solutions into an integrated database/network services solution.

Many health care institutions do not have the internal resources to develop complex integrated database/network services solutions. In addition, the future of integrated technology solutions in the medical care industry will require integration of data and electronic messaging across individual provider institutions, such as exists within some managed health care

© 1994 by INPUT. Reproduction Prohibited.

networks; integration among a variety of insurance payers and suppliers; as well as intercommunity connectivity, which can cross competitive lines. The latter would be an example of an integrated patient record that includes clinical data from a physicians group that might be used by other health care providers, who may also be competitors.

In some parts of the country, regional health care alliances integrate through network services that provide common standards for network and integrated database access.

In general, computer applications in the health care industry are unique in that they provide industry-specific solutions.

Many companies providing client/server architectural solutions target the health care industry. Several of these are companies with horizontal (primarily desktop for financial services/human resources) applications. Much of the installed computer technology in the health care field is based on proprietary equipment. There is considerable inertia in migrating from legacy to open systems, which could be client/server-based. However, the health care industry is also generally considered behind other industries in the installation of integrated database solutions. Part of this is because much of the capital spending for competitive purposes has been for leading-edge medical equipment. However, with the higher cost to payers of health services, payers are asking health care providers for new kinds of information to justify service costs. A core question is how the cost of a particular procedure compares with the outcome and cost of a procedure at a competitive medical facilities. This forces health care providers, for example, to provide integrated patient record solutions to show competitive cost and quality services. To demonstrate the relationship between patient costs and patient outcomes, there is a need, in particular, to integrate administrative, financial and clinical systems.

Some of the faster growing information technology market segments within the health care field are solutions for managed care networks, outpatient surgical centers, ambulatory centers and home health care programs.

Principal individual health services categories of medical information are listed in Exhibit III-9.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT III-9

Health Services

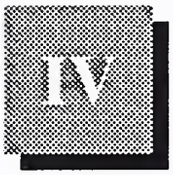
Categories of Medical Information Systems

- Billing and financial accounting systems
- Cost and profitability analysis systems
- Patient business information systems
- Clinical records and patient-care systems
- Services and patient/resources scheduling systems
- Departmental systems

The digitizing of patient-care data from electromechanical devices, which record heart and other bodily functions, is one of the key areas of information to be included in an integrated medical record. Computerized patient-care systems can also greatly assist doctors and nurses in care planning. Leading suppliers in this market include companies such as CliniCom and HBO & Co., which demonstrated strong growth over the past two years.

Longer term, the outcome of particular patient treatment protocols must be justified to payers on a cost and quality of care basis. Such point-of-care digital collection systems should be one of the most important new sources of information in providing "competitive" information.

© 1994 by INPUT. Reproduction Prohibited.



User Requirements and Analysis

System integration solutions in the health care industry are provided by software and turnkey systems vendors as well as by professional services firms, systems integrators, outsourcers and computer systems vendors.

Essentially, the medical care industry is behind in the implementation of integrated database and network services solutions. Exceptions are health care suppliers and claims processing services providers, who currently utilize primarily proprietary electronic commerce implementations.

Various integration systems solutions are greatly needed in the health care industry to improve efficiencies and quality of health care service delivery.

In addition to the ultimate enterprise-wide or interenterprise-based integrated patient record, other integrated applications requirements today in the Health Services area are included in Exhibit IV-1.

For years, hospitals have extensively used outside vendors—starting with remote processing services and often evolving to the use of turnkey and application software vendors—to meet their information systems needs. There is no reason to believe this need will decrease. Managed care, managed competition and federal health care reform are all driving medical institutions to change at a pace that internal expertise is unlikely to cope with, especially in terms of systems development, outsourcing, integration and implementation of systems operations. Systems integration opportunities in health care are among the highest of any vertical market group. A number of large medical care services systems integration contracts have not been visible in publicly announced contract wins, but in part this may be because many institutions prefer to keep such contract information private for strategic reasons.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT IV-1

Examples of More Recent Systems Integration Applications in the Health Services Industry

- Documentation services for patient treatment protocols
- Workflow document imaging solutions
- Profitability analysis for marketing and planning
- Computerized patient medical records
- Departmental database integration—clinical/financial/ administrative
- Automated claims processing
- Automated product ordering and delivery
- Teleservices Centers (TSC) for intelligent marketing
- Business process re-engineering—redesign of standard operating patient care process
- Establish links for physician supplies
- Design support systems—multidatabase access

A major opportunity also exists for services in the front-end, business re-engineering portion of the systems integration business. Andersen Consulting, which INPUT identifies as having the largest market share in the SI medical services market, has its "Hospital of the Future" program. Many newer technologies for creating integrated applications in the medical care markets will be most effectively used only within the context of fundamental medical operations re-engineering to take advantage of the new opportunities for information capture and use.

However, significant expansion of the medical systems integration market is not projected until the 1994-1995 period, when federal reform-based managed competition implications of integrating financial and patient-care systems becomes clear to the medical industry. Until that time, expenditures will be modest, at an estimated $300 million in 1993, but an acceleration in the growth rate is expected in 1995.

© 1994 by INPUT. Reproduction Prohibited.

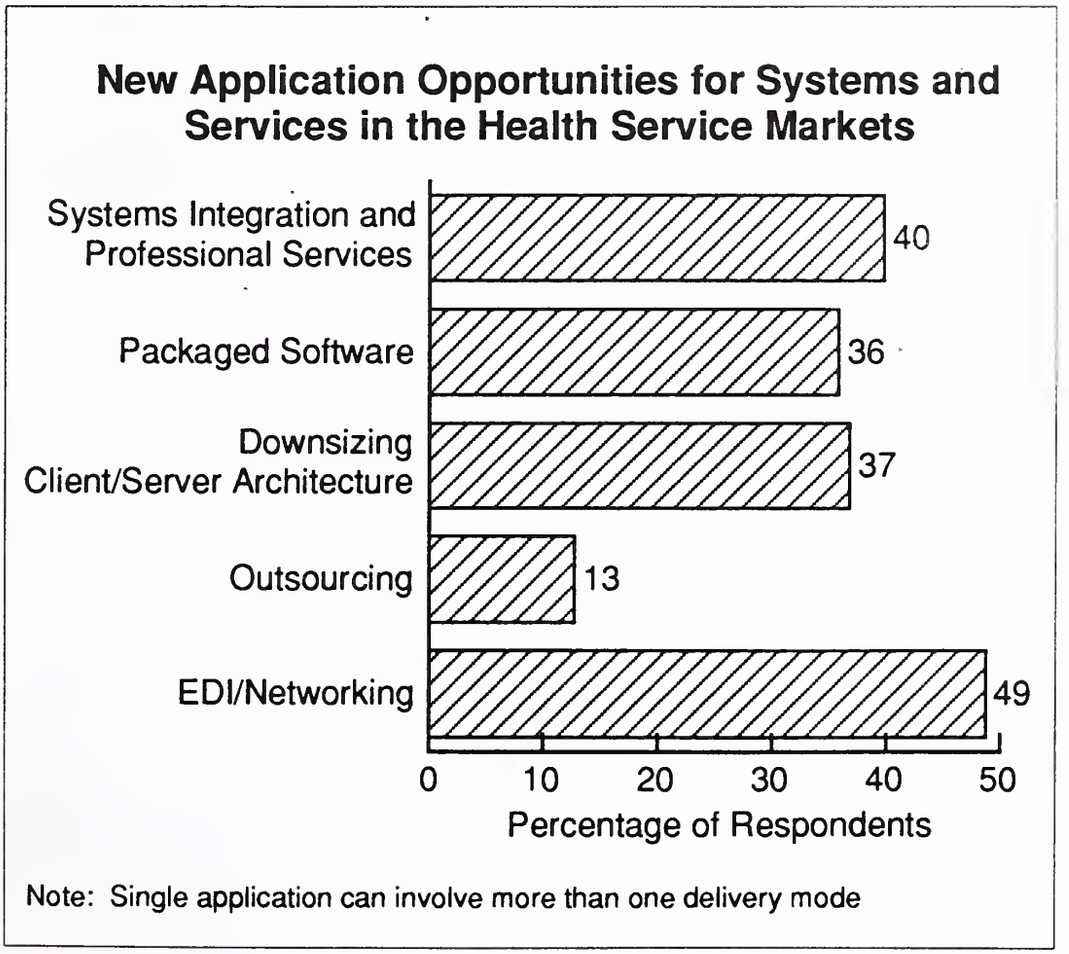
A

Analysis of INPUT's Opportunity Database

INPUT conducted a major survey of the corporate user community in 1993 across all major industry-specific industries (as defined by Department of Commerce SIC codes) on their planned computer applications. Approximately 2,000 application development "opportunities" were identified. Products within various vertical markets were also classified by the following delivery modes and/or computer architectures: systems integration and professional services; packaged software, downsizing and client/server; outsourcing; and EDI/Networking.

In the health services industry, 149 new application opportunities were indicated. They were distributed across the above referenced delivery modes and computer architectures, as shown in Exhibit IV-2.

EXHIBIT IV-2



Of the 60 new applications in systems integration and professional services identified in the Health Services industry, 80% were identified as professional services projects. This suggests that health care users are considering smaller projects, which they define as professional services, rather than full systems integration work.

© 1994 by INPUT. Reproduction Prohibited.

Exhibit IV-3 includes particular new systems integration applications identified in the survey of Health Services IS respondents.

EXHIBIT IV-3

Examples of Systems Integration Applications Identified in INPUT's Survey of Health Services Computer Application Decision Makers

SI Application	Benefit	Platform
1. Claims Processing	Cost savings	Mainframe
2. Patient Information System	Replacing old system	Mainframe
3. Pharmacy	Better control—moving to independent platform	Hybrid AS/400
4. Patient Billing System	Common system	Mainframe
5. Clinical Application	Be more efficient	Mainframe, mini, client/server, LAN
6. Desktop Publishing	Need to upgrade	Minicomputer, client/server LAN
7. Budgeting	Better efficiency in hospital budget	Mainframe—download to PC LAN
8. EDI Claims Submission	Automation of claims processing	Mainframe
9. Field Operations	Strategic systems	Hybrid—UNIX distributed/network
10. Billing and Accounting	Problems with lost changes	Mainframe

© 1994 by INPUT. Reproduction Prohibited.

Of particular significance is the continuing strong role of the mainframe in new application development among Health Services provider respondents. Also, although the survey was targeted at user groups within various institutions, it is noteworthy that in many cases project management responsibility was shared across user, IS and corporate staff.

B
User Needs Analysis

INPUT also conducted a follow-up, in-depth analysis of systems integration needs of Health Services providers. Many respondents were health care institutions that indicated a need for new systems integration applications over the next one to three years. Many of those surveyed had also indicated a prior interest in the possible use of an outside systems integrator to implement particular projects.

1. Relative Importance of Particular Information Technology for Health Services Applications

Survey respondents to INPUT's survey, which was concentrated exclusively on the Health Services industry, included: large private and university hospitals, a leading HMO facility, a large clinical facility and a leading home health care provider.

Among the respondents, the most important technologies relative to their systems integration applications development plans were network integration and integrated database technology. Other technologies that ranked high among the respondents include: barcode technology, EDI and open systems.

A lower level of interest was shown in multimedia, expert systems technologies and interactive video technologies.

2. Planned SI Applications Among Survey Respondents That Could Involve Internal or External Systems Integration Resources

These Health Services central IS and user department respondents also identified particular types of systems integration applications they planned to implement over the next three years, which could involve use of either internal or external systems integration resources.

Twenty-three different types of systems integration application alternatives were presented (see Appendix A—Questionnaire).

The SI applications cited most frequently by the respondents are shown in Exhibit IV-4.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT IV-4

Most Frequently Mentioned SI Applications Cited in INPUT's Survey of U.S. Health Care Services Providers*

SI Application	Percent of Respondents
Integrated patient care management	86
Implementation of open systems strategy	86
Client/server (downsizing/rightsizing) implementation	83
LAN integration	79
Automation of patient protocol documentation	79
Automation of insurance claims processing	79
Development of a document management/workflow interdepartmental solution	75
Implementation of IS for analyzing patient care costs	71
Development of linkages between hospital financial systems and hospital clinical care facilities	71
LAN-to-WAN integration	71
Supply chain linkage (EDI/electronic commerce)	71

*Includes multiple responses for each respondent

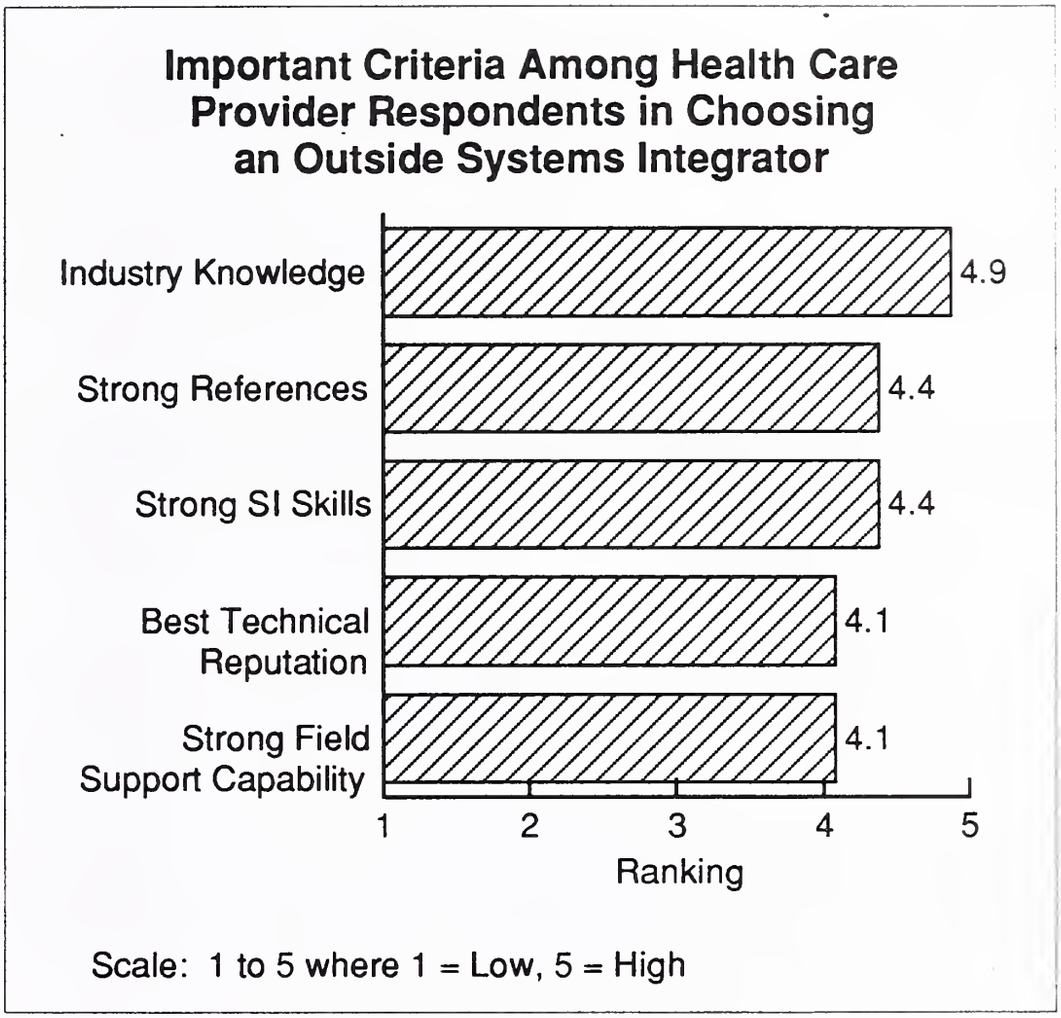
When asked whether they would use an outside systems integrator to implement the solutions they had cited, the vast majority indicated they would consider the possibility. However, certain respondents indicated negative experiences with outside consultants. Specific complaints involved cost overruns and poor quality of implementation.

3. Important Criteria in Choice of an Outside Systems Integrator

The most important criteria respondents indicated in selecting an outside systems integrator are shown in Exhibit IV-5.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT IV-5



Clearly, industry knowledge, good references and strong technological capabilities are the three key criteria in their selection of an SI vendor.

C

Vendor Response

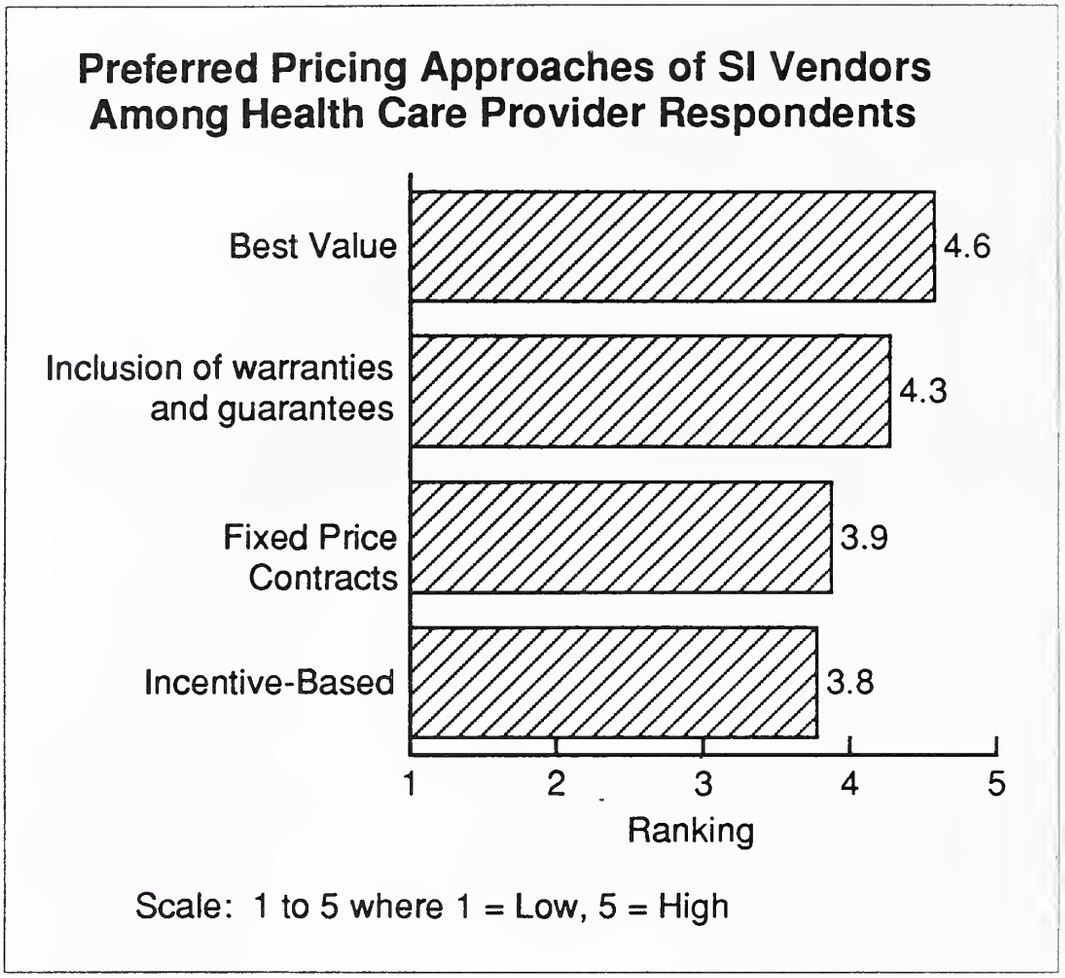
1. Preferred Pricing Approaches of SI Vendors

INPUT's Health Services provider survey included the preferred pricing approaches of SI vendors, as indicated in Exhibit IV-6.

Another recent INPUT survey on pricing strategies of SI vendors across a number of vertical industries indicates that the approach of "best cost/best value" alternative pricing is now among the more successful.

© 1994 by INPUT. Reproduction Prohibited.

EXHIBIT IV-6



This data suggests that with increasing competition in the Systems Integration industry, cost/price to the customer plays a more active role in SI negotiations. Although customers may in fact request best business practice solutions and value-added services from vendors, they are not paying higher prices.

This does not imply that today's market requires vendors to offer the lowest-cost alternative, but that price sensitivity issues are a stronger force in today's SI market.

Vendors, however, are not sacrificing work quality in this more intensive competitive environment, but they are more efficient at delivering services with technology improvements and proven methodologies, which help control customer costs.

© 1994 by INPUT. Reproduction Prohibited.

No single pricing strategy is generally applicable to a specific industry or across the board. The scope of the proposed SI venture determines pricing. Several factors combine to influence how a job is priced for each potential customer:

- Project complexity
- Project size/volume/length
- Partnership dimensions
- Schedule constraints
- Project risk

Pricing strategies must be flexible to accommodate variances in technical and managerial complexity. Complex projects bring an associated higher value to a contract, provided the return on investment to the customer is high, especially in providing mission-critical applications solutions. A contract specifying a large volume of services most likely lowers the vendor's overall customer service costs. These savings can be passed on to the customer. A long-term contract promises less financial risk in terms of underutilized staff and personnel. These savings often translate into a better price for the customer. A project on a tight schedule means higher prices.

The extent of the business partnership commitment between vendor and customer also affects pricing. If the vendor assumes more risks associated with completing an SI project, higher costs are passed on to the customer. On the other hand, in a true partnership arrangement, the customer actively participates in the SI process and takes on the necessary steps to ensure that the solution will be accepted operationally within the enterprise. Sharing responsibility with the vendor places another dimension on overall price that can be beneficial to the customer.

SI vendors in INPUT's cross-industry survey were also asked how they forsaw their companies' pricing strategies changing over the next five years. Approximately one-third saw no change in their pricing strategies. A little more than one-third indicated they expected to include more of a total solutions focus, providing not only more value-added services, but a greater scope of services. The remainder indicated that change would be customer-driven or would involve lowering costs, including more risk-sharing contracts between client and vendor.

In general, across-the-board pricing is not practiced in the systems integration industry. The price a customer pays is based on unique negotiations with the vendor.

© 1994 by INPUT. Reproduction Prohibited.

2. General SI Vendor Trends

a. Evolving Definition of the Systems Integration Delivery Mode

Historically, the systems integration delivery mode of vendor services was considered an outgrowth of the professional services. The definition of the systems integration delivery mode continues to evolve today.

At one time, clients' needs focused more on consultation and implementation of integration. With increasing dimension of users' business needs and increasing complexity of changing technology in recent years, many larger SI vendors, in particular, expanded their "systems integration" services to include a full array of information technology.

Some of the more recent value-added services now asked of SI contractors include: Business Redesigner, Technology Facilitator, Change Manager and Business Consultant. In addition, larger companies in systems management/systems operation markets are moving more into the systems integration industry. Systems operations market leaders indicate that many of their more recent contracts include systems integration features. In addition, companies originally leading providers of front-end consulting and business re-engineering services are also moving into the systems operations area.

The role of technology facilitator is demanded by a broader spectrum of systems integration providers. Users find it far too complex and resource-intensive to keep up with evolving technology and managing multivendor environments. In addition, moves to client/server and desktop operating environments provide further complexity issues. Users overwhelmed by tasks of applying rapidly changing technology and managing new environments rely more on their contractors to be technology consultants.

Business process re-engineering (BPR) demands vary considerably among industries. More companies in manufacturing, wholesale and finance sectors and in government entities, particularly defense agencies, want SI contractors to function as business redesigners.

Change management is described by vendors as the responsibility for supporting technological, educational and organizational changes associated with BPR changes. This role continues until changes are institutionalized within the organization. If an SI contractor performs BPR and SI services, it is natural that they will also manage the change process to ensure the successful completion of the project.

In the past, SI contractors only provided training services for their newly developed systems. The scope of this responsibility was considerably smaller. Because of BPR, the concept of education and training is greatly expanded and now entails enterprise-wide managing training services.

© 1994 by INPUT. Reproduction Prohibited.

b. Strategic Partnering

Systems integration vendors usually do not provide the total solution for a systems integration product and services solution from their own resources. In the Health Services sector, with the great variety of applications addressing a number of different types of health care providers, much of the software and turnkey systems applications are provided by industry product partner specialists. In addition, there is some transference of applications solutions from particular systems integration contracts, where the systems integration contractor can retain ownership rights to the developed product. This should be particularly efficient for cross-industry applications such as document management/workflow solutions. In some cases, such products are licensed to other vendors, which can also help reduce the maintenance burden for the systems integrator.

With the wide variety of health care product requirements, it makes more sense for systems integrators to partner with the "best of breed" suppliers for application development requirements, and put more individual emphasis on front-end consulting, systems integration and systems management.

Leading vendors of systems integration services to the health services markets are:

- Andersen Consulting
- IBM
- Digital Equipment Corp.
- Computer Sciences
- EDS
- Unisys
- Planning Research Corp./ATI
- Coopers & Lybrand
- Deloittle and Touche
- Cap Gemini
- Shared Medical Systems
- Keane, Inc.
- CyCare Systems
- IBAX Healthcare Systems
- Source Data Systems
- C.I.S. Technologies

© 1994 by INPUT. Reproduction Prohibited.

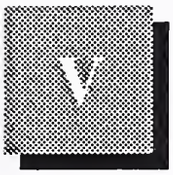
Leading vendors of medical and health care applications software products in 1992 are included in Exhibit IV-7.

EXHIBIT IV-7

Medical and Health Care
Leading Applications Software Vendors, 1993

Vendor	U.S. 1993 Market Share (Percent)
SMS (Shared Medical Systems)	9
TDS Healthcare Systems	6
HBO & Co.	6
IBAX Healthcare Systems	5
MEDITECH	5
Dun & Bradstreet Software	2
Global Software	1
Source Data Systems	1
Elcomp Systems	1
Micro Healthsystems	1
C.I.S. Technologies	1
Leading Vendor Total	38

© 1994 by INPUT. Reproduction Prohibited.



Keys to Success in Penetrating the Health Care Information Services Markets

A
Targeting Opportunities

With profitability issues impacting many Health Services providers, systems integrators should initially target institutions that demonstrate financial stability and have access to outside financing, such as municipal bond funding or equity financing as public companies.

Many leading managed health care organizations and hospital chains are publicly owned, and their profitability levels are available for analysis. Public financial records show that many standalone rehabilitation and other ambulatory care facilities appear to be doing better financially than many large, acute care hospitals.

Overall, a significant restructuring process is occurring in the health care industry, primarily in response to profitability issues. Provider groups are merging with each other under umbrella managed care health care plans to form large, integrated health care systems, sometimes referred to as medical enterprises. These types of organizations want to achieve economies of scale by sharing resources.

Such large, integrated managed care organizations, in particular, will likely lead in integrated database and network services solutions, combining clinical, hospital and insurance company claims processing integration. Successful implementation of such cross-institutional integrated solutions should provide reference points for systems integrators to address other Health Services providers with implementation reference models.

Also, systems integrators should provide EDI linkages among cross-industry participants (for claims processing, sharing electronically-based patient records, etc.) for the critical mass to make such systems cost effective. One initial major interenterprise application in the health

© 1994 by INPUT. Reproduction Prohibited.

services industry will likely be EDI integration among suppliers, insurance companies and the integrated managed care enterprise when they can see examples of cost benefits of such integrated network services programs based on industry standards.

In addition to sharing funding of the development of such systems, it demonstrates the cost benefits of open systems architectures in document networking and other types of information resources.

Although the interenterprise solution of an integrated patient medical record is probably the ultimate solution, it appears that at this stage of systems integration in the medical industry (which is somewhat behind other industries), smaller integration steps to ultimately achieving such a solutions are probably best to target. In particular, integration of institutional departmental database islands is probably the most realistic SI applications area to target at this stage in the development of the Health Services SI market.

Systems integrators, network services, turnkey systems and software products vendors specializing in the medical services markets should develop strategic partnerships for providing systems integration services for the multiplicity of health care provider needs. Suppliers to the health care provider industry represent a fragmented industry, with many specialty vendors within various delivery modes. Because of the wide variety of applications in the medical field and the need to keep up with fast-changing approaches to patient care, no single systems integrator can provide much of the total solution from internally-based resources.

However, supplier industry consolidation is also expected to accelerate over the next several years as vendors achieve greater efficiencies in product and service delivery. It is important for systems integrators to work with the medical equipment and software products companies that have strong market share positions and that will be beneficiaries of such industry consolidation.

B

Successful Marketing Approaches

INPUT surveyed a number of systems integration vendors in 1993 on what they considered to be significant factors in recent successful SI contract bids. A combination of technical excellence and competitive price were the most important factors.

The data suggests, at this stage in the development of the SI industry, the role of technology facilitator is one most frequently played by vendors in SI engagements. At present, for the largest number of customers, SI

© 1994 by INPUT. Reproduction Prohibited.

contractors are hired mainly for the level of technical expertise they bring to the customer's organization. In health services, industry knowledge is equally important. INPUT's survey of targeted health care providers uncovered providers who had tried using outside professional services and systems integrators vendors, but had been disappointed as measured particularly by such factors as quality of the solution and/or cost overruns.

Users also seemed particularly concerned about getting the best value for their investment.

The trend for user's organizations to ask, "What value to my organization can I expect to receive from an SI venture?" is gaining momentum. Third-party systems integrators should reduce costs, improve productivity for strategic expertise within industries and reduce internal risk of application development.

A key factor for differentiating SI skills to a potential customer is a strong reputation based on previous contracts within an industry.

At this stage in the market development for Health Services systems integration, it is important for the SI vendor to also stress business process re-engineering. Many health services providers have resisted information technology change, and the value of such change (particularly the integrated database structure) can only be shown through proposing a difference in the way tasks are performed by medical employees. Directing the business process re-engineering process can provide an initial framework for restructuring the entire enterprise, and thus can put the front-end consultant in a preferred position for further systems integration contracts with the same institution.

As SI integration becomes more competitive, a very important vendor approach will be to provide full services to the customer based on a longer-term business-partner relationship. Entry into this longer-term relationship often comes by providing a front-end business process re-engineering solution. This can lead to building specific business solutions that incorporate methodologies of the consultant as well as the consultant developing what could become the master plan for business process change throughout the organization. This can lead to more flexibility in negotiating on contract terms, such as developing total solution (bundling) pricing approaches to SI services.

Emphasis should be placed on open systems solutions (because of the longer-term necessity to provide linkages throughout the medical community) and client/server architectures to eventually reduce the cost of information systems expenditures and ease the development and usage of departmentally integrated database solutions.

© 1994 by INPUT. Reproduction Prohibited.

Also, providing an educational role to clients on newer technologies, such as object-oriented technology and distributed database architectures, will provide entry to many medical facilities, because they lack the internal staffing to work with newer technologies not based on mainframe systems solutions.

A key marketing factor for SI vendors is to develop customers into long-term business partners. The value-added pricing component in systems integration longer-term is likely to be in the breadth and uniqueness of ongoing services. Product element pricing of the systems integration solution are also likely to become much more price-sensitive in the future, with software tradeoffs and other types of tradeoffs made to obtain more long-term services.

SI vendors who have capital resources should also consider strategic funding of development and implementation costs, which also includes customer leases of completed systems from the vendor. A vendor's advantage is that the system can be remarketed to multiple potential customers. The payback potential from repeat sales could be high over the extended life cycle of the system.

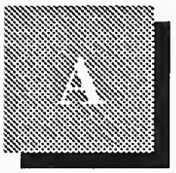
Over the long term, success in the SI medical services industry will likely be segmented between large full-service suppliers and companies with strong technical skills in medical-specific equipment and software that develop longer-term services contracts such as software maintenance (re-engineering), network or systems management and customer training for targeted individual customer projects.

C
Major Contracts Awards

INPUT's list of systems integration contract awards across multiple industries over the past three years shows a very limited number of contracts identified as medical services. This could, in part, reflect lack of many large contracts, with the exception of those awarded in the insurance industry specializing in health care claims. It appears the number of direct SI contracts with Health Services providers is still relatively small and that secrecy of awards is important for strategic reasons.

The National Marrow Donor Program (funded by a consortium of the National Institute of Health, the U.S. Navy and a number of transplant centers) recently awarded an SI contract of larger scope to Andersen Consulting.

© 1994 by INPUT. Reproduction Prohibited.



Health Services User Questionnaire

INPUT, a leading provider of market research and management consulting services on the information services markets, is currently studying how third-party systems integrators can enhance their SI services offerings to the health services markets.

As part of this study, INPUT is interviewing a number of U.S. health services providers who are implementing systems integration projects either through internal or external systems integration resources.

© 1994 by INPUT. Reproduction Prohibited.

1. Relative Importance Of Information Technologies For Health Care Applications, Involving Internal Or External SI-Based Solutions

Rate the following SI-related technologies as to their importance to your current or future health care operations, based on a scale of 1 to 5, *where 5 means extremely high, and 1 means extremely low.*

a. Network Integration	1	2	3	4	5
b. Integrated Databases	1	2	3	4	5
c. Distributed Network Management	1	2	3	4	5
d. Distributed Systems Management	1	2	3	4	5
e. Open Systems	1	2	3	4	5
f. Workflow-based Applications	1	2	3	4	5
g. Multimedia Applications	1	2	3	4	5
h. Centralized Information Resources	1	2	3	4	5
i. Imaging—Document Processing	1	2	3	4	5
j. Wireless Communications	1	2	3	4	5
k. Expert Systems	1	2	3	4	5
l. Voice Recognition Technology	1	2	3	4	5
m. Smartcards	1	2	3	4	5
n. EDI/Electronic Commerce	1	2	3	4	5
o. Touch Screen Technology	1	2	3	4	5
p. Pen-based Systems	1	2	3	4	5
q. Interactive Video	1	2	3	4	5
r. Broad-band Networks	1	2	3	4	5
s. E-Mail	1	2	3	4	5
t. Barcode Technology	1	2	3	4	5

© 1994 by INPUT. Reproduction Prohibited.

2. Planned SI Applications That Could Involve Internal Or External Systems Integration Resources

Please check the following types of SI applications you plan to implement over the next one to three years.

a. _____ Integrated patient care management system

b. _____ Development of a document management/workflow interdepartmental solution

c. _____ LAN integration

d. _____ LAN to WAN (backbone network) integration

e. _____ Migration from legacy to distributed systems solutions

f. _____ Development of standard (GUI) user interfaces across the enterprise

g. _____ Development of linkages between hospital financial system and hospital clinical care facilities

h. _____ Automation of patient care bedside systems

i. _____ Patient care cost tracking

j. _____ Implementation of an open systems strategy

k. _____ Networking of a local medical community

l. _____ On-line image processing application for X-ray technology and/or other medical records

m._____ Changing from external processing services to internal systems integration solution

n. _____ Automation of patient protocol documentation

o. _____ Automated insurance claims processing

p. _____ Implementation of Executive Information System (EIS) for analyzing patient care costs

q. _____ Re-engineering of medical operations

r. _____ Client/server (downsizing/rightsizing) implementation

s. _____ Supply chain linkage (EDI/electronic commerce)

tt. _____ Marketing application (indicating cost/quality competitor factors)

© 1994 by INPUT. Reproduction Prohibited.

u. _____ Integration information application for centralized analysis of costs

v. _____ Application to integrate departmental systems—such as pharmacy, laboratories, outpatient systems, etc.

w. _____ Implementation of interhospital communications networks

3. Would You Consider The Use Of An Outside Systems Integrator To Implement Any Of The Above Applications? _____Yes _____No

Please explain your answer.

_____

_____

_____

_____

4. What Do You Consider The Most Important Criteria In Your Selection Of An Outside Systems Integrator?

Please rank on a scale of 1 to 5, with 5 being the highest level of importance.

a. Strong References	1	2	3	4	5
b. Industry Knowledge	1	2	3	4	5
c. Strong SI Skills Set	1	2	3	4	5
d. Financial Strengths	1	2	3	4	5
e. Business Process Re-engineering Capabilities	1	2	3	4	5
f. Project/Program Management Strengths	1	2	3	4	5
g. Global Presence	1	2	3	4	5
h. Strengths in Applications Development/Maintenance	1	2	3	4	5

© 1994 by INPUT. Reproduction Prohibited.

i. Systems Operations/Facilities Management Capabilities	1	2	3	4	5
j. Strategic Partnerships with Leading Vendors	1	2	3	4	5
k Compatible Business Cultures/Values Which Would Enhance Partnering	1	2	3	4	5
l. Strong Field Support Capabilities	1	2	3	4	5
m. Training Programs	1	2	3	4	5
n. Pricing Alternatives	1	2	3	4	5
o. Can Provide an SI Financing Program	1	2	3	4	5
p. Best Technology Reputation	1	2	3	4	5

5. Preferred Pricing Approaches of SI Vendors

Please rank satisfaction as a user with the following contract negotiation approaches by systems integrators, as to degree of preference, with 5 representing the highest level.

a. Fixed Price	1	2	3	4	5
b. Cost-plus	1	2	3	4	5
c. Incentive-based	1	2	3	4	5
d. Time Dependent	1	2	3	4	5
e. Based on Risk Assessment	1	2	3	4	5
f. Incorporation of Performance Clauses	1	2	3	4	5
g. Incorporation of Warranties/ Guarantees	1	2	3	4	5
h. Best Value	1	2	3	4	5
i. Other _____	1	2	3	4	5

© 1994 by INPUT. Reproduction Prohibited.

5) What Impact Will the Proposed National Health Care Reform Program Have on Your Delivery of Health Services?

© 1994 by INPUT. Reproduction Prohibited.